MATHEMATICS FOR PRIMARY SIX FIRST TERM

PREPARED BY

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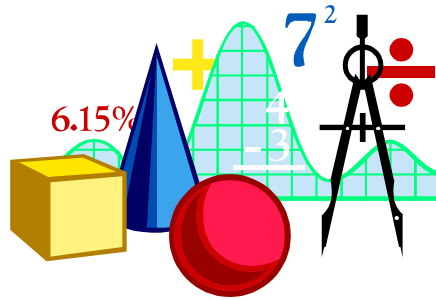
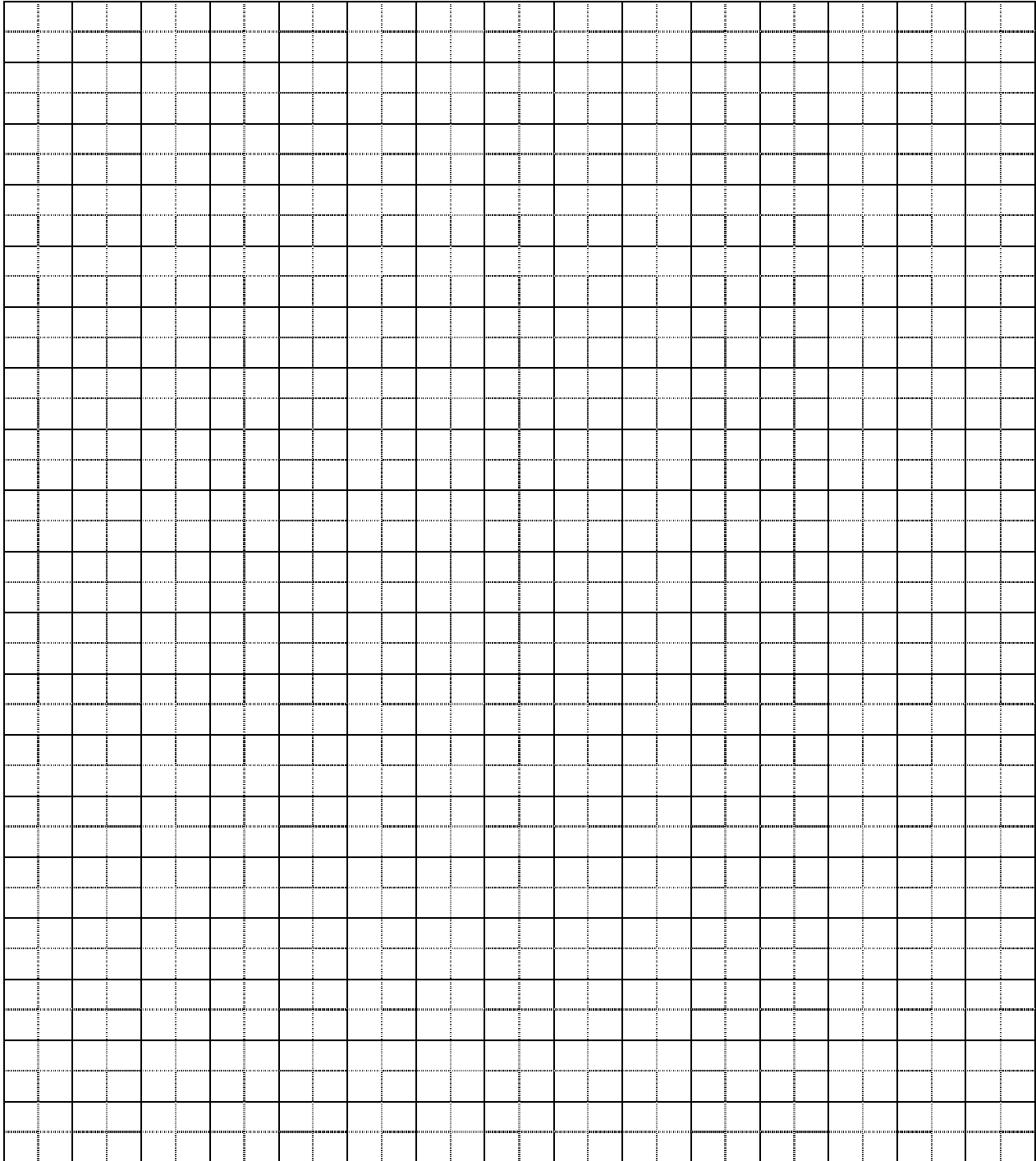
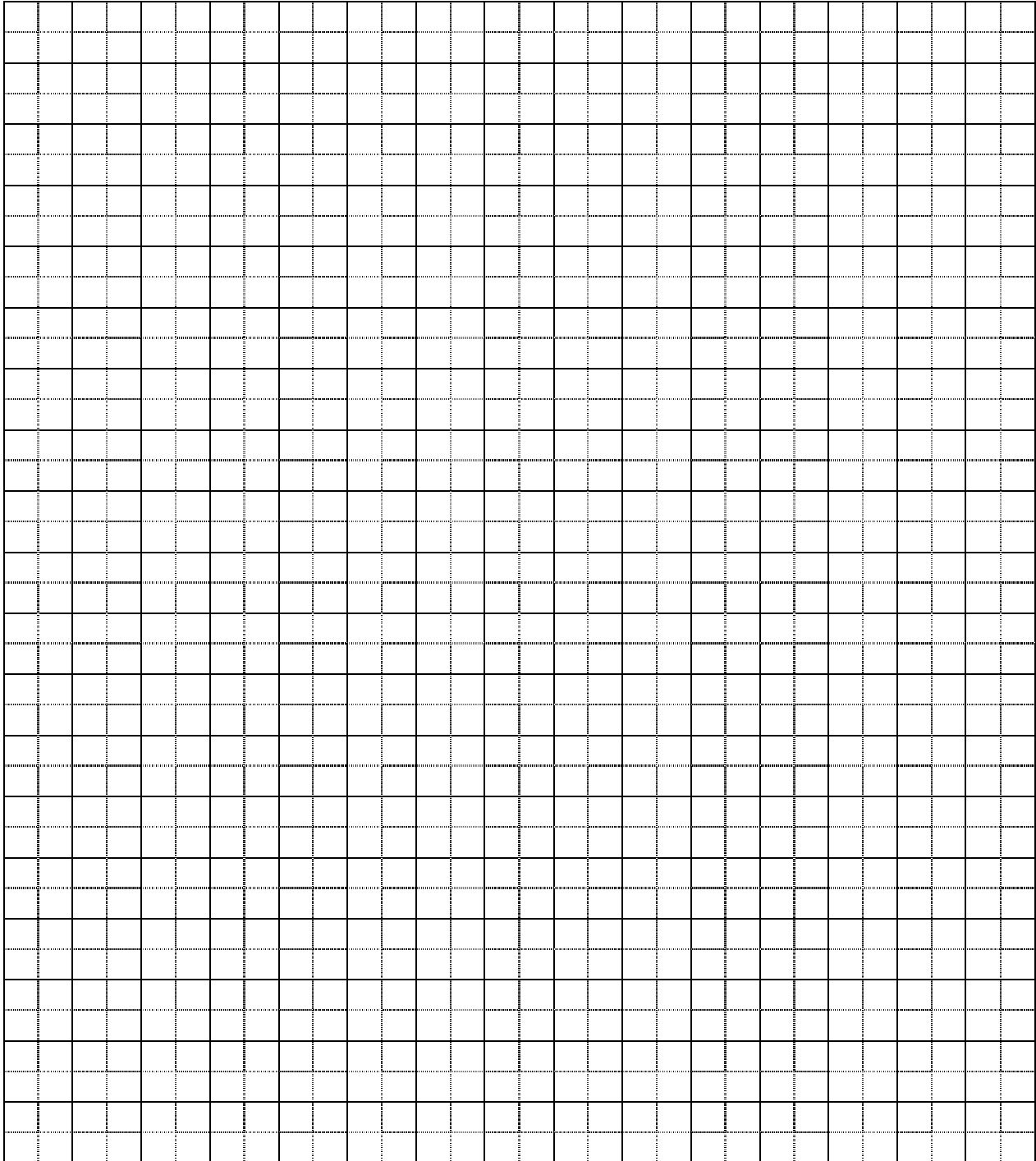
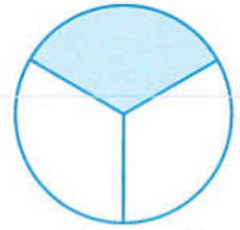

Revision on Representing Data

Representing data by the histogram and frequency polygon

[1] Draw the histogram which represents the following table:

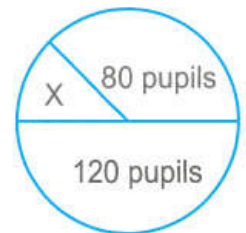
Sets	10-	20-	30-	40-	Total
Freq.	10	12	18	10	50

[2] The following table shows the frequency distribution of working hours of 50 workers:

Sets	4-	6-	8-	10-	Total
Freq.	14	10	8	18	50

Draw the frequency polygon which represents these data.

1. The colored part represents .... the surface of the circle.

($\frac{1}{2}$ or $\frac{2}{3}$ or $\frac{1}{4}$ or $\frac{1}{3}$)

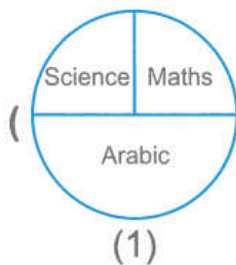
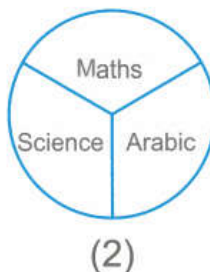
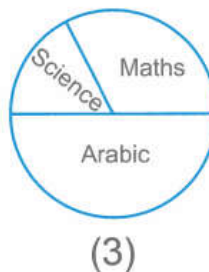
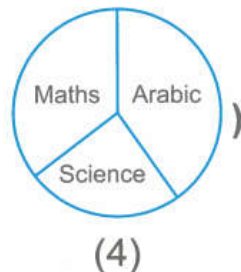
2. In the opposite circular sector :

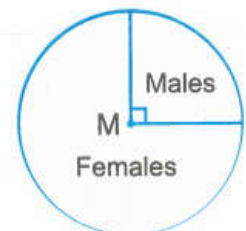
X represents .... pupils.

X
80 pupils
120 pupils

(40 or 80 or 120 or 240)

3. The circular sector which represents the following data is number ....

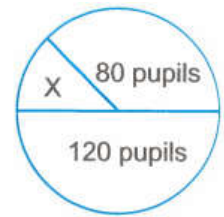
The subject	Arabic	Maths	Science
Number of studying hours	3	2	1

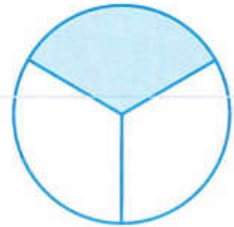
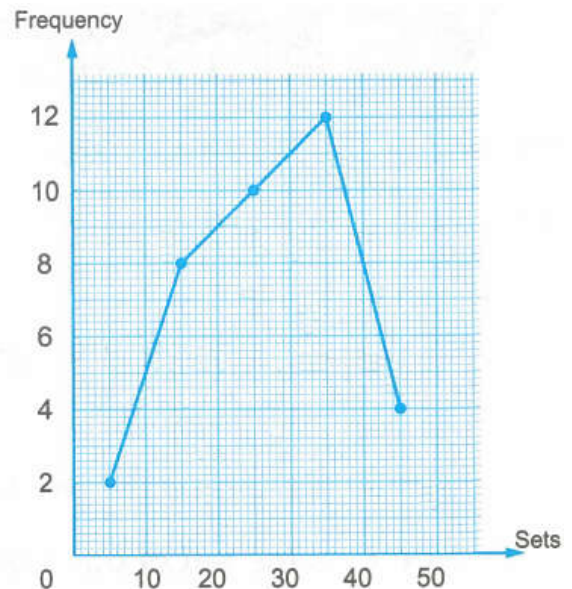
((1) Science, Maths, Arabic or (2) Maths, Science, Arabic or (3) Science, Maths, Arabic or (4) Maths, Arabic, Science)

4. 200 candidates have applied for a test to hire male and female anchor persons in the televison. If the opposite pie graph represents the given data, the number of female candidates who applied for that test is ....

Males
M
Females

(50 or 200 or 100 or 150)

5. **In the opposite circular sector :**

120 pupils represents .... of the circle.

($\frac{1}{5}$ or $\frac{1}{4}$ or $\frac{1}{3}$ or $\frac{1}{2}$)

6. The colored part represents .... the surface of the circle.

($\frac{1}{2}$ or $\frac{2}{3}$ or $\frac{1}{4}$ or $\frac{1}{3}$)

7. Representation of this data is called ....

(pie graph or histogram or frequency polygon or bar graph)

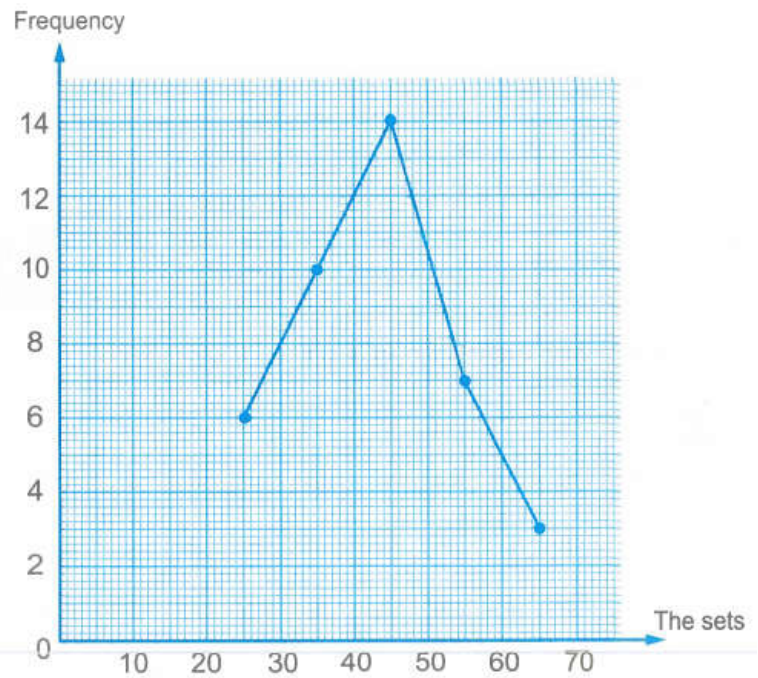
8. The following table shows the recorded temperatures in 40 cities on a day :

Temperature	20 –	22 –	24 –	26 –	28 –
No. of cities	7	9	11	8	5

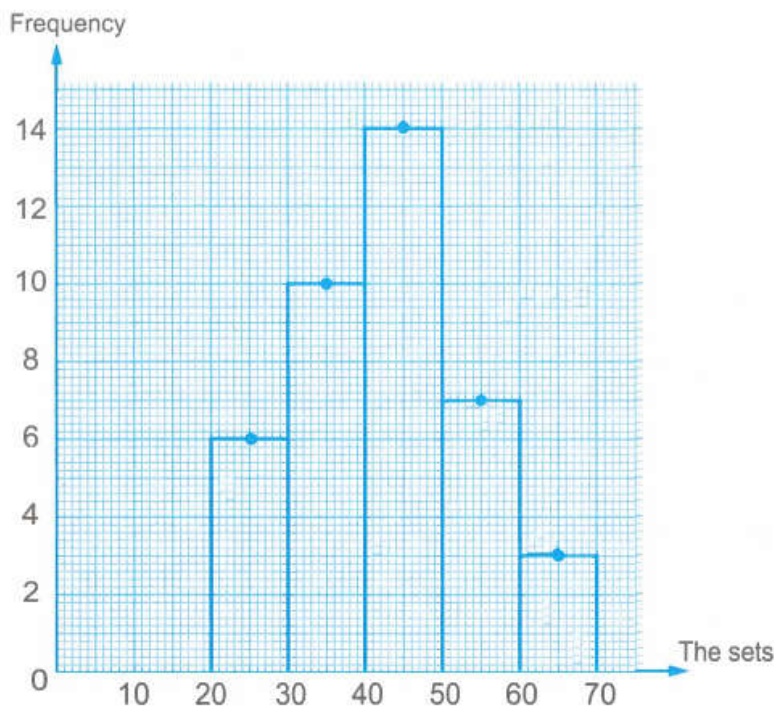
[a] The number of cities with temperatures less than 24 degree celsius = ... (7 or 9 or 11 or 16)

[b] The number of cities with temperatures 28 degree celsius or more = ... (5 or 14 or 15 or 16)

9.

The frequency polygon represents the marks of 40 pupils in one test , the centre of the set 40- is ……………

(14 **or** 40 **or** 45 **or** 150)

10.

The opposite figure shows the marks of 40 pupils in one test , the number of pupils who got less than 40 marks = ……………

(30 or 20 or 16 or 10)

11. The following table shows the marks of 40 pupils in one test :

The sets	10 –	20 –	30 –	The sum
Frequency	10	12	18	40

, then the number of pupils who got 30 marks and more = ...

(18 **or** 44 **or** 40 **or** 80)

12. The following table shows the recorded temperatures in 40 cities on a day :

Temperatures	20 –	22 –	24 –	26 –	28 –	Total
Number of cities	7	9	11	8	5	40

The number of cities with temperatures less than 24 degree celsius = ... cities. (11 **or** 16 **or** 27)

13. The following table represents the marks of 50 students in the math exam in a month , where the full mark is 50 :

Sets	10 –	20 –	30 –	40 –	Total
Frequency	10	12	18	10	**50**

The number of the students who got 30 or more marks is ....

(28 **or** 10 **or** 30 **or** 12)

14. The following table shows the marks of 40 pupils in one test :

The sets	10 –	20 –	30 –	The sum
Frequency	10	12	18	**40**

The number of pupils who got 30 marks and more = ...

(18 **or** 44 **or** 40 **or** 80)

15. The following table shows the frequency of the marks of 50 students in mathematics :

Sets	10 –	20 –	30 –	40 –	Sum
Ferquency	8	14	10	18	**50**

The number of students who got 30 marks and more is ....

(10 or 18 or 28 or 50)

16. The following table shows the marks of students in math test :

The sets	– 5	– 10	– 15	– 20	– 25	Total
Frequency	5	9	11	6	4	…………

The total number of students in math test is ……………

(30 or 35 or 40 or 11)

17. From the following table :

Sets	10 –	20 –	30 –	Total
No. of pupils	7	13	5	**25**

, the centre of the set 20 – is …………… (15 or 20 or 25 or 30)

From the previous table , the number of students who got less than 30 marks = …………… (20 or 13 or 7 or 29)

18. The following table shows the marks of 40 pupils in a mathematics exam :

Sets	10 –	20 –	30 –	40 –	50 –	Total
Frequency	6	10	13	7	4	**40**

The centre of the set 40 – is …………… (40 or 45 or 15 or 13)

From the previous table, the number of pupils whose marks are less than 30 is …………… (16 or 13 or 6 or 29)

19. The following table shows the marks of 40 pupils in one test :

The sets	10 –	20 –	30 –	Total
Frequency	10	12	18	**40**

The number of pupils who got 20 marks and more = ……………

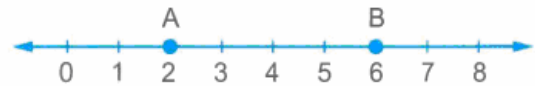
(18 or 44 or 40 or 30)

20. The following table shows the marks of 35 pupils in mathematics exam in one months where the full mark is 50 :

Sets	10 –	20 –	30 –	40 –	Total
Frequency	8	K	10	5	35

The value of K = ... (8 **or** 10 **or** 12 **or** 15)

21. **On the opposite number line :**

The length of $\overline{AB}$ = ... unit length.

(2 **or** 4 **or** 5 **or** 6)

22. **In the opposite figure :**

A B
0 1 2 3 4 5

The length of $\overline{AB}$ = ... units.

(2 **or** 4 **or** 5 **or** 6)

23. On the number line, the length of $\overline{AB}$ = ... units.

(2 **or** 3 **or** 4 **or** 5)

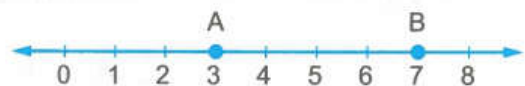
24. If A (2 , 4) , B (2 , 6) , then the midpoint of $\overline{AB}$ is ....

((4 , 10) **or** (2 , 5) **or** (0 , 0))

25. If X (3 , 4) , Y (3 , 9) , then the length of $\overline{XY}$ = ... units.

(6 or 5 or 6 or 13)

26. **On the opposite number line :**

The length of $\overline{AB}$ = ... units.

(4 or 10 or 3 or 7)

SHEET (1)

The meaning of ratio and its properties

The ratio: Comparing between two numbers or two quantities by division.

The ratio between two numbers = $\frac{1st\ number\left(antecedent\right)}{2nd\ number\left(consequent\right)}$ **or 1st no. : 2nd no.**

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[1] Put each of the following ratios in its simplest form:

(a) 6 : 8

(b) 15 : 24

(c) 21 : 9

(d) 7 : 21

(e) 500 : 700

(f) $\frac{17}{85}$

(g) $\frac{19}{114}$

(h) $\frac{57}{76}$

(i) $\frac{25}{25}$

(j) $\frac{16}{8}$

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[2] Put each of the following ratios in its simplest form:

(a) $\frac{1}{2} : \frac{1}{4}$

(b) $\frac{1}{2} : \frac{3}{4}$

(c) $\frac{4}{5} : \frac{2}{5}$

(d) $\frac{3}{4} : \frac{5}{6}$ (e) $\frac{5}{8} : \frac{3}{4}$ (f) $\frac{1}{3} : 2$

(g) $5 : \frac{4}{5}$ (h) $1\frac{1}{2} : 1\frac{1}{2}$ (i) $3\frac{4}{7} : 3\frac{1}{8}$

(j) $3 : 4\frac{3}{4}$

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[3] Put each of the following ratios in its simplest form:

(a) 1.2 : 3.6 (b) 2.3 : 5.75 (c) 1.5 : 3

(d) 6.4 : 16 (e) 5.5 : 22 (f) $2.4 : 2\frac{2}{5}$

(g) $3.2 : \frac{8}{5}$ (h) $1.5 : 1\frac{3}{4}$ (i) $2\frac{1}{2} : 1\frac{2}{3}$

(j) $3\frac{1}{8} : 6.25$

SHEET (2)

Follow Lesson (1)

Remember that:

(1) The perimeter of square = S × 4

(2) The area of square = S × S

(3) The area of square = $\frac{1}{2}$ diagonal × itself = $\frac{1}{2}$ d × d

(4) The perimeter of rectangle = (L + W) × 2

(5) The area of rectangle = L × W

(6) The circumference of the circle = d × π or 2 π r

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[1] Complete:

(1) The ratio between the side length of the square (or rhombus) and its perimeter is ……… : ………

(2) The ratio between the perimeter of the square (or rhombus) and its side length is ……… : ………

(3) The ratio between the side length of equilateral triangle and its perimeter is ……… : ………

(4) The ratio between the perimeter of equilateral triangle and its side length is ……… : ………

(5) The ratio between the diameter of a circle and its circumference is ……… : ………

(6) The ratio between the circumference of a circle and its diameter is ……… : ………

(7) The ratio between the radius length of a circle and its circumference is ……… : ………

(8) The ratio between the circumference of a circle and its radius length is ……… : ………

(9) The ratio between two side lengths of a square is ……… : ………

(10) The ratio between the perimeter of a square and the perimeter of an equilateral triangle having the same side is ……… : ………

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[2] Choose the correct answer:

(1) The ratio between two numbers 16 and 64 is …… $\left(\frac{1}{6}, \frac{2}{3}, \frac{1}{4}, \frac{1}{3}\right)$

(2) $\frac{3}{2} : \frac{7}{3}$ = …… : …… (3 : 7 , 9 : 14 , 7 : 3 , 3 : 2)

(3) $3\frac{1}{5} : 9.6$ = …… : …… $\left(\frac{1}{6}, \frac{3}{2}, \frac{1}{3}, \frac{2}{3}\right)$

(4) $\frac{2}{3} : 3\frac{1}{3}$ = …… : …… (1 : 5 , 1 : 2 , 2 : 5 , 1 : 10)

(5) A rectangle which length is 9 cm and its area 54 cm^2, then the ratio between its length and width = …… : …… (1 : 6 , 6 : 1 , 3 : 2 , 2 : 1)

(6) If the length of a rectangle is 6 cm and its area is 24 cm^2, then the ratio between its perimeter and its length is = …… : ……
(4 : 1 , 3 : 2 , 12 : 5 , 10 : 3)

(7) A rectangle of length 10 cm and its width is $\frac{3}{5}$ of its length, then the ratio between its width and its perimeter = …… : ……
(5 : 16 , 5 : 3 , 3 : 16 , 16 : 3)

[3] Story problems:

(1) If Ahmed has L.E. 40 and his sister Hend has L.E. 160 Find the ratio between what Ahmed has and what his sister has.

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(2) The total number of boys and girls in a school is 480, if the number of boys in this school is 320 Find:

(a) The ratio between the No. of boys and that of girls.

(b) The ratio between the No. of boys and the total No. of pupils.

(c) The ratio between the No. of girls and the total No. of pupils.

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(3) The area of a rectangle is 32 cm^2 and its width is 4 cm Find:

(a) The length of the rectangle.

(b) The ratio between the width of the rectangle and its length.

(c) The ratio between the length of rectangle and its perimeter.

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SHEET (3)

Lesson (2)

Remember that:

(1) The ratio between two quantities of the same kind doesn't have any unit.

(2) Length units: $km \xrightarrow{\times 1000} m \xrightarrow{\times 10} dm \xrightarrow{\times 10} cm \xrightarrow{\times 10} mm$

(3) Area units: $km^2 \xrightarrow{\times 1000000} m^2 \xrightarrow{\times 100} dm^2 \xrightarrow{\times 100} cm^2 \xrightarrow{\times 100} mm^2$

(4) Weight units: $ton \xrightarrow{\times 1000} kg \xrightarrow{\times 1000} gm$

(5) Capacity units: $Litre\left(dm^3\right) \xrightarrow{\times 1000} ml\left(cm^3\right)$

(6) Time units: $year \xrightarrow{\times 12} month$

$week \xrightarrow{\times 7} day \xrightarrow{\times 24} hr \xrightarrow{\times 60} min \xrightarrow{\times 60} sec$

(7) Agricultural Lands units: $feddan \xrightarrow{\times 24} kirat \xrightarrow{\times 24} sahm$

(8) Money units: $L.E. \xrightarrow{\times 100} P.T.$

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[1] Find the following ratios in the simplest form:

(1) 3000 gm : 5 kg = ……… : ………

(2) 2 kg : 300 gm = ……… : ………

(3) P.T. 25 : L.E. 2 = ……… : ………

(4) 18 hours : 2 days = ……… : ………

(5) 1.75 metres : 150 cm = ……… : ………

(6) 400 cm : 2 m = ……… : ………

(7) 250 gm : $\frac{1}{2}$ kg = ……… : ………

(8) 12 kirats : 2 feddans = ……… : ………

(9) $\frac{1}{2}$ m^2 : 75 dm^2 = ……… : ………

(10) $3\frac{1}{2}$ L : 2500 ml = ……… : ………

(11) 16 kirats : 1 feddan = ……… : ………

(12) 250 piastres : $7\frac{1}{2}$ pounds = ……… : ………

(13) 12 kirats : $2\frac{1}{2}$ feddans = ……… : ………

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[2] Choose the correct answer:

(1) 400 gm : 2 kg = ……… : ……… $(1:2$ *or* $1:4$ *or* $1:8$ *or* $1:5)$

(2) 400 cm : 3m = ……… : ……… $(4:3$ *or* $30:4$ *or* $40:3$ *or* $3:4)$

(3) 3m : 20 dm = ……… : ……… $(3:2 \ or \ 3:200 \ or \ 3:20 \ or \ 30:2)$

(4) 5 weeks : 25 days = ……… : ……… $(1:5 \ or \ 5:7 \ or \ 7:5 \ or \ 5:1)$

(5) 18 kirats : 2 feddans = ……… : ……… $(9:2 \ or \ 3:4 \ or \ 9:1 \ or \ 3:8)$

(6) P.T. 500 : L.E. 15 = ……… : ……… $(1:5 \ or \ 1:3 \ or \ 3:1 \ or \ 5:1)$

(7) 2 km : 800 m = ……… : ……… $(1:4 \ or \ 5:2 \ or \ 1:2 \ or \ 4:1)$

(8) 75 cm : $2\frac{1}{4}$ m = ……… $\left(\frac{1}{3}cm \ or \ \frac{1}{3}m \ or \ \frac{1}{3} \ or \ 3\right)$

(9) 4.5 dm^3 : 2500 cm^3 = ……… : ……… $(5:9 \ or \ 9:5 \ or \ 9:50 \ or \ 50:9)$

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[3] Find in the simplest form the ratio between:

(1) 250 cm and 275 cm

(2) 250 gm and $\frac{1}{2}$ kg

(3) $2\frac{1}{2}$ hours and 75 minutes

(4) 250 piastres and $7\frac{1}{2}$ pounds

(5) $2\frac{1}{4}$ days and 36 hours

(6) $5\frac{1}{4}$ pounds and 125 piastres

(7) 7.5 dm and 30 cm

(8) 2.25 feddans and 16 kirats

(9) 150 mL and $\frac{1}{4}$ L

(10) 2 kirats and 18 sahms

(11) 8 hours and $3\frac{1}{3}$ days

(12) 16 kirats and 1 feddan

[4] Story problems:

(1) Karim is 1.75 m tall and his friend Mohamed is 150 cm tall. Find the ratio between Karim's height and Mohamed's.

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(2) Two lorries, the load of the first is 600 kg and the load of the other is $1\frac{1}{2}$ ton. Find the ratio between the load of the first and the load of the second.

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(3) A square of side length 9 cm and a triangle of base length 16 cm and its corresponding height is 9 cm. Find the ratio between the area of triangle : the area of the square.

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(4) A triangle of base length 3 cm and its corresponding height is 4 cm and a parallelogram of base length 14 cm and its corresponding height is 5 cm. Find the ratio between the area of triangle : the area of the parallelogram

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SHEET (4)

Miscellaneous exercises on ratio and its properties

(1) The ratio between the number of girls and the number of boys in a school is 3 : 8 if the number of girls is 312, find the number of boys.

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(2) The ratio between the height of each of Ayman and Mina is 9 : 10 if Mina is 144 cm tall. Find Ayman's height.

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(3) If the ratio between the weight of Hany and the weight of Ahmed is 5 : 6 and the weight of Ahmed is 60 kg. Calculate the weight of Hany.

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(4) If the ratio between the age of a child and the age of his father is 2 : 13 and if the child's age is 6 years. Find the father's age.

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(5) The ratio between Ayman's savings and Amr's savings is 5 : 9 If Amr's savings are are L.E. 72 Find the value of Ayman's savings.

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(6) The ratio between the lengths of two pieces of cloth is 9 : 10 and the length of the first piece is 86.4 m Find the length of the second.

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(7) A piece of wire was divided into 2 parts in the ratio 5 : 9 If the length of the shortest part equals 45 cm. Find the length of the piece of wire.

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(8) The ratio between the height of a building and height of Cairo Tower is $\frac{4}{15}$. If the height of the building is 48 metres. Find the height of Cairo Tower.

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(9) The number of pupils in the sixth grade in one of school is 260 and the ratio between the number of boys to girls is 6 : 7 Find the number of each of boys and girls in this grade.

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(10) In one of our schools, there are 560 students, if the number of girls = $\frac{3}{5}$ of the number of boys. Find each of the number of boys and girls in this school.

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(11) The ratio between two numbers is 7 : 12 Find the two numbers if their **sum** is 76

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(12) The ratio between Sameh's weight and Youssef's weight is 5 : 7 and the **difference** between their weights is 14 kg. Find the weight of each of them.

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(13) The ratio between the heights of two buildings in a town is 7 : 4, if the **difference** between their heights is 9 metres. Find the height of each of them.

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(14) The ratio between Amgad's money and Karim's money is 7 : 9 Find Amgad's money and Karim's money if Karim's money **exceeds** Amgad's money by L.E. 5

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(15) If we divided a piece of building land between two brothers by the ratio 7 : 4 and if the share of the first **more than** the share of the second by 60 square metres.

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(16) In a primary school which is mixed, if the ratio between the number of boys and that of girls is 5 : 3, if the number of boys **more than** of girls is 80 boys. Find the number of each of boys and girls in this school.

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(17) If the ratio between the areas of two pieces of land is 5 : 9, if the area of one piece **exceeds** the other by 132 m^2. Find the area of each of the two pieces.

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(18) In a school, there are 300 pupils in the sixth grade who have a maths exam. If the ratio of the pupils who succeeded to the pupils who failed is 5 : 1 Find the number of each of them.

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(19) If the ratio between the side lengths of two squares is 3 : 5 and their **sum** is 64 cm. Find the two side lengths.

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(20) If the ratio between the two acute angles in a right-angled triangle equals 2 : 1 Find the measure of each angle.

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[2] Choose the correct answer:

(1) If the ratio between what Said saves and what Khalid saves is 5 : 6 and if what Khalid saved is L.E. 72, then Said saved L.E……

(30 *or* 40 *or* 50 *or* 60)

……………………………………………………………………………………

……………………………………………………………………………………

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(2) If the ratio between the number of girls and the number of boys in a school is 3 : 5 and the number of girls is 300, then the total number of the pupils equals ………

(500 *or* 800 *or* 900 *or* 1500)

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……………………………………………………………………………………

(3) If the ratio of the clever pupils in a primary school to the total number of the pupils is 1 : 6, what is the number of the clever pupils if the total number of the pupils is 750 pupils?

(25 *or* 225 *or* 125 *or* 250)

……………………………………………………………………………………

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(4) If a : b = 5 : 3 and a – b = 8, then b = ………

(6 *or* 8 *or* 10 *or* 12)

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……………………………………………………………………………………

(5) If the ratio between Rania's height and Shadia's height is 3 : 4 and Shadia's height is 120 cm, then the height of Rania is …… cm

(90 *or* 40 *or* 60 *or* 30)

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……………………………………………………………………………………………

(6) The ratio between the age of two pupils is 3 : 4 and the difference between their ages is 3 years, then the age of the older is ……… years.

(3 *or* 9 *or* 4 *or* 12)

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……………………………………………………………………………………………

(7) There are 700 students in a school and the number of girls is $\frac{3}{4}$ of the number of boys, then the number of girls = …… students.

(300 *or* 400 *or* 200 *or* 500)

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SHEET (5)

The ratio among three numbers

[1] Put the following ratios in its simplest form:

(1) 12 : 18 : 36

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……………………………………………
……………………………………………

(2) 45 : 30 : 75

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(3) 21 : 63 : 35

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(4) 56 : 32 : 40

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(5) 5.4 : 7.2 : 4.8

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(6) 2.4 : 1.8 : 3

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……………………………………………

(7) $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

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……………………………………………
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(8) $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$

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(9) $\frac{1}{4} : \frac{2}{5} : \frac{3}{10}$

……………………………………………
……………………………………………

(10) $\frac{2}{3} : \frac{3}{4} : \frac{1}{2}$

……………………………………………
……………………………………………

(11) $1\frac{1}{2} : 1\frac{1}{8} : \frac{3}{4}$

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(12) $\frac{1}{2} : 2\frac{1}{4} : 4\frac{1}{2}$

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[2] Find the ratio of each of the following quantities in its simplest form:

(1) 7 kg : $2\frac{1}{2}$ kg : 4500 gm

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(2) 2.8 km : 9800 m : 15.4 km

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(3) 2.1 m : 140 cm : 0.49 m

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(4) L.E. 8 : L.E. 12 : P.T. 3200

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[3] Complete:

(1) If A : B = 2 : 3 and B : C = 3 : 5, then A : C = ... : ......

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(2) If A : B = 2 : 3 and B : C = 6 : 7, then A : C = ... : ......

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(3) If A : B = 4 : 3 and B : C = 2 : 3, then A : C = ... : ......

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(4) If A : B = 3 : 4 and B : C = 8 : 5, then A : B : C = …… : …… : ……

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(5) $\frac{1}{2}$: $\frac{3}{4}$: $\frac{2}{3}$ = 6 : …… : ……

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[4] Choose the correct answer:

(1) 30 : 40 : 60 = ……… [3:4:6 or 4:6:3 or 3:6:4]

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(2) $\frac{1}{2}$: $\frac{1}{7}$: $\frac{1}{14}$ = ……… [7:2:1 or 1:2:7 or 7:1:2]

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(3) $1\frac{1}{2}$ kg : 1000 gm : 2 kg = …… [3:2:4 or 2:4:3 or 4:3:2]

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(4) If A:B = 2:3 and A:C = 2:5, then B:C = … [1:4 or 5:3 or 3:5 or 4:5]

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(5) If A:B = 5:6 and B:C = 3:4, then A:C = … [5:4 or 5:3 or 5:8 or 3:5]

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(6) If A:B = 2:3 and C:B = 5:2, then A:C = … [2:5 or 4:15 or 15:4 or 5:3]

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[5] Story problems:

(1) If the ratio among the measurements of the angles of a triangle is 1:2:3 Find the measure for the smallest angle.

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(2) If the tallness of Sahar : the tallness of Noha = 2:3 and the tallness of Noha : the tallness of Ola = 6:7 Find the tallness of Sahar : the tallness of Ola.

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(3) If Mona's weight : Rania's weight : Donia's weight is 7:9:11 and Mona's weight is 35 kg. Find the weight of each of Rania and Donia.

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(4) If the ratio among the height of three buildings is 3:4:5 and the height of the first building is 12 metres. Calculate the heights of the second and the third building.

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(5) The ratio among three numbers is 3:5:7 and their sum is 45. Find the value of each number.

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(6) The ratio of the production of three factories for TV sets is 3:2:1, if the sum of production of first and second factories is 25000 sets. Find the production of each one.

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(7) If the ratio among ages of Hoda, Mona and Ola is 2:4:5 and the difference between the age of Hoda and that of Mona is 8 years. Calculate the age of each of Hoda, Mona and Ola.

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(8) The ratio among the money what Hoda has to what Ahmed has to what Smah has is 6:5:2 find how much money each of them has if Hoda's money is more than Samah's money by L.E. 200

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(9) The ratio among the production of three factories is 9:7:11 and the production of the third factory exceeds the production of the first one by 1000 tons. Find the production of each factory.

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(10) ABC is a triangle, where AB:BC:AC = 7:5:4 and AC = 64 cm. Find AB, BC and the perimeter of the triangle.

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(11) The ratio between the lengths of the sides of a triangle is 2:3:4, if the perimeter of the triangle is 54 cm. Find the length of each side of the triangle.

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(12) If the ratio among the measures of angles of a triangle is 5:6:7 and the measure of the first angle is 50°. Find the measure of each of the other two angles.

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(13) The ratio among the measures of the angles of a triangle is 3:7:8 Find the measure of the greatest angle of this triangle.

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(14) The ratio among the measurements of the angles of a triangle is 2:3:4 Find the measure of each angle in this triangle.

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(15) ABC is a triangle in which AB:BC:AC = 3:5:7, if BC exceeds AB by 20 cm. Find the length of each side.

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(16) If weight of Noura to weight of Manar = 1:3 and weight of Manar to weight of Nahla = 2:5 Find the ratio among weights of Noura, Manar and Nahla.

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(17) If the ratio between the tallness of Khalid to the tallness of Ahmed is 2:3 and the ratio between the tallness of Ahmed to the tallness of Hany is 4:5 Calculate the ratio between the tallness of Khalid to that of Hany.

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(18) If Kamal has $\frac{3}{4}$ of Ramzy's money and Hany has $\frac{2}{5}$ of Ramzy's money. Find the ratio of Kamal's money to Ramzy's money to Hany's money.

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SHEET (6)

Applications on ratio (Rates)

The rate is the ratio between two quantities of different kind

[1] Complete:

(1) A family spends L.E. 480 in 6 days, the rate of what family spends per day = …………… L.E. per day.

(2) A worker paints a wall of area 100 m^2 at 8 hours, then the rate of work = ………… m^2/hr.

(3) A plough for agricultural land ploughs 12 feddans within 3 hours, then the rate of this plough = ………… feddans/hr.

(4) If a runner covers 600 m in 4 minutes, then the rate of distance covered in one minute is ………… m/min.

(5) A computer colour printer prints 60 papers each 5 minutes, then the rate of work of this printer is ……… paper/min

(6) A factory produces 4000 cans of juice during 8 hours, then the rate of the production = ……………… cans/hr

(7) If a car covered 210 km within 3 hours, then the rate of covered distance per hour = ……… km/hr.

(8) A carpenter needs 25 m^2 of kind of wood to make 10 tables, then the rate of used wood = ………… m^2/table.

(9) A water tap is leaking 360 litres of water in one hour, then the leaking rate of water per minute = ……… litre/minute.

(10) A machine produces 600 metres of clothes regularly in one hour and half, then the rate of production = ……… m/hr

[2] Choose the correct answer:

(1) If a car covered 180 km in 3 hours, then the speed of this car = ……… km/hr. [60 or 80 or 90 or 540]

(2) Ali spends L.E. 75 within three days, then the rate of what Ali spends = ……… L.E./day. [25 or 30 or 45 or 135]

(3) If Hazem drinks 21 glasses of milk weekly, then the rate of what he drinks daily is ………… glasses. [20 or 7 or 14 or 3]

[3] Story problems:

(1) A car consumes 35 litres of gas to cover 140 km. Calculate the rate of consumption.

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(2) A factory produces 5000 juice cans in 8 hours. Find the production rate.

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(3) A factory produces 7200 bottles of soft drink in 8 hours. What is the rate of production?

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(4) A water tap is leaking 20 litres of water in 5 hours. Find the leaking rate of water per hour.

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(5) A computer printer prints 120 papers each 4 minutes. Find the rate of work of this printer.

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(6) A ship for transporting goods among countries consumes 25 litres of fuel to cover 15 km. Calculate the rate of consumption of fuel.

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SHEET (7)

Proportion and its properties

Proportion: is an equality of two or more ratios.

Properties of proportion:

(1) If we multiply (or divide) each of the two terms of a ratio by the same non-zero number, then the resultant ratio is equal to the first ratio and they together form proportion.

(2) The product of extremes = the product of means.

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[1] Find the value of x in each of the following proportions:

(1) $\frac{5}{8} = \frac{15}{x}$ $x = $........................

(2) $\frac{1}{2} = \frac{6}{x}$ $x = $........................

(3) $\frac{2}{7} = \frac{8}{x}$ $x = $........................

(4) $\frac{x}{6} = \frac{20}{30}$ $x = $........................

(5) $\frac{35}{42} = \frac{x}{6}$ $x = $........................

(6) $\frac{4}{5} = \frac{x}{1.25}$ $x = $........................

(7) $\frac{x}{5} = 3$ $x = $........................

(8) $\frac{24}{x} = 0.8$ $x = $........................

---

[2] Use the method of the cross multiplication to find the missing number in each of the following proportions:

(1) $\frac{7}{9} = \frac{\dots\dots}{72}$ $x = $........................

(2) $\frac{5}{8} = \frac{17.5}{\dots\dots}$ $x = $........................

(3) $\frac{.....}{21} = \frac{5}{6}$ $x = ...$

(4) $\frac{18}{.....} = \frac{27}{49}$ $x = ...$

(5) $\frac{28}{49} = \frac{......}{35}$ $x = ...$

(6) $\frac{48}{64} = \frac{7.5}{......}$ $x = ...$

(7) $\frac{.....}{14} = \frac{45}{21}$ $x = ...$

(8) $\frac{1.5}{......} = \frac{2.25}{0.6}$ $x = ...$

(9) $\frac{.....}{8.8} = \frac{36}{99}$ $x = ...$

(10) $\frac{68}{51} = \frac{5.6}{......}$ $x = ...$

[3] Find the missing term in each of the following proportions:

(1) 5, 6, 10 and .... $x = ...$

(2) ......, 8, 16 and 64 $x = ...$

(3) 18, 36, ... and 10 $x = ...$

(4) 0.8, 4.8, ... and 12 $x = ...$

[4] Find the value of x in each of the following proportions:

(1) 9, 21, 3 and x $x = ...$

(2) 5, 25, x and 10 $x = ...$

(3) 3, 4, 9 and x $x = ...$

(4) x, 12, 3 and 4 $x = ...$

[5] Complete:

(1) $\frac{2}{5} = \frac{\dots\dots}{20}$

(2) If $\frac{2}{11} = \frac{4}{x}$, then $x = \dots\dots\dots\dots$

(3) If $\frac{4}{7} = \frac{x}{35}$, then $x - 3 = \dots\dots\dots\dots$

(4) The fourth proportional of 10, 14 and 20 is ……………………….

(5) If $\frac{x-3}{3} = \frac{5}{3}$, then $x = \dots\dots\dots\dots$

(6) If $\frac{x+5}{3} = 7$, then $x = \dots\dots\dots\dots$

(7) If $\frac{a}{b} = \frac{c}{d}$, then $a \times d$ = ……………………….

(8) If $\frac{3}{7} = \frac{12}{y}$, then 3 × y = ……… × ………

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[6] Choose the correct answer:

(1) If $\frac{2}{7} = \frac{x}{21}$, then $x = \dots\dots\dots\dots$ [6 or 21 or 12 or 7]

(2) If $\frac{2}{5} = \frac{x}{20}$, then $x = \dots\dots\dots\dots$ [8 or 6 or 4 or 2]

(3) If $\frac{x+2}{8} = \frac{3}{4}$, then $x = \dots\dots\dots\dots$ [2 or 4 or 6 or 8]

(4) If the numbers 6, 8, 3 and x are proportional, then $x = \dots\dots$
[4 or 5 or 6 or 8]

(5) If the ratio 7 : 13 is the same ratio x : 52, then $x = \dots\dots$
[14 or 21 or 28 or 35]

(6) If $a : b$ = 2 : 5, then $\frac{a}{a+b} = \dots\dots$ [2:5 or 2:7 or 3:7 or 7:2]

[7] Story problems:

(1) Ali bought 5 kg of orange, he paid L.E. 15 How much money does he pay to buy 8 kg?

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(2) If 35 litres of milk produce out 16 kg of butter. Find how many kg of butter can be produced out of 56 litres of milk.

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(3) If 15 kg of flour produce out of 150 loaves of bread. How many loaves of bread can be produced out of 22.5 kg of flour?

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(4) The price of 15 litres of liquid soap is L.E. 7.5 Find:
(a) The price of 45 litres of the same soap.
(b) Number of litres of price L.E. 11.5

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(5) A car consumes 20 litres of petrol to cover 210 km. How many litres of petrol does the car consume to cover 630 km?

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(6) A minaret of height 75 m, its shadow length is 25 m. Calculate the height of a tree of shadow length 2 m at the same moment.

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(7) A primary school, its building is 14 metres and the shade of this building at a certain moment is 7 m long. What is the height of a tree in the same moment if its shade length is 2 metres?

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SHEET (8)

Drawing Scale

Drawing scale = length in drawing : length in reality

$$D.S. = \frac{D.L.}{R.L.}$$

Notice that:

(1) Both lengths should have the same units.

(2) 1 km = 100 000 cm

(3) If D.S. < 1, then it refers to minimization (reduction).

(4) If D.S. > 1, then it refers to enlargement (magnification).

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[1] Story problems:

(1) If the length on drawing is 2 cm and the real length is 6 m, then the drawing scale = ... : ......

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(2) The length of an insect in the picture is 4 cm and its real length is 2 mm, then the drawing scale = ... : ......

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(3) If the distance between two cities on a map is 3 cm and the real distance between them is 9 km. Find the drawing scale of the map.

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(4) The distance between two cities is 40 km and the distance between them on a map is 8 cm. Find the drawing scale of this map.

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(5) A magnifying glass is used to magnify an insect of real length 0.4 mm if its magnified length is 6 cm. Calculate the ratio of magnification.

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(6) If the drawing scale < 1, this expresses ....

(7) If the drawing scale > 1, this expresses ....

(8) If the drawing scale is 1 : 1000 and the drawing length is 2.5 cm, then the real length = ...m

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(9) If the drawing scale is 1 : 2 000 000 and the map length is 3 cm, then the real length = ... km

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(10) Ahmed drew a picture of his brother Osama with a drawing scale 1 : 40, if the real height of Osama is 160 cm. What is his height in the picture?

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(11) A map was drawn with a scale 1 : 500 000, if the distance between two cities on the map was 14 cm. Find the real distance between these two cities in kilometers.

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(12) A picture of Cairo Tower was photographed with a scale 1 : 7 000 Find the real height of the Tower if its height in the picture is 2.7 cm.

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(13) A magnified picture of an insect was taken with an enlargement ratio 100 : 1, if the length of insect in the picture is 2.5 cm. What is the real length of insect?

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(14) A picture of a natural scene is drawn with a drawing scale 1 : 100, if the real length of a tree is 8 metres. Find its length in the picture.

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(15) A microscope was used to magnify an insect of real length 0.8 mm in the ratio 100 : 1 Calculate the length of the insect after magnification.

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(16) A road of length 2.4 km is drawn on a map with a drawing scale 1 : 200 000 Find the length of this road on the map in cm.

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(17) An engineer drew a map of a garden with a scale 3 : 500, if the side length of a garden on the map is 3.6 cm. Find the real side length of this garden.

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SHEET (9)

Revision

[1] Complete:

(1) The ratio is ………………………………………………………………………………

(2) The proportion is ………………………………………………………………………

(3) If 5, 7, 20 and x are proportional, then x = ………..

(4) If 6, 9, x and 18 are proportional, then x = ………..

(5) If 6, x, 12 and 10 are proportional, then x = ………..

(6) The ratio between the side length of a square and its perimeter = …… : ……

(7) The ratio between the side length of an equilateral triangle and its perimeter = …… : ……

(8) The ratio between the diameter length of a circle and its circumference = …… : ……

(9) If the ratio among the measures of the angles of a triangle is 1:2:3, then the measure of the smallest angle is ………

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(10) 12 kirats : $1\frac{1}{2}$ feddans = …… : …… (in the simplest form)

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(11) If a:b = 2:3 and b:c = 6:7, then a:c = …… : ……

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(12) If a:b = 3:5 and b:c = $\frac{2}{5}$, then a:c = … : …

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(13) A car covers 180 km in 3 hours, its average speed is ……… km/hr

(14) 6.3 : 1.4 = …… : …… (in the simplest form)

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(15) If the drawing scale < 1, then this expresses ………………………………

(16) The distance between two cities is 50 km and the distance between them on a map is 5 cm, then the drawing scale = … : …

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[2] Choose the correct answer:

(1) If $\frac{1}{3} = \frac{5}{x}$, then x = ……… (1 or 3 or 5 or 15)

………………………………………………………………………………………………

(2) $\frac{1}{3} : \frac{1}{4}$ = …… : …… (1:3 or 1:4 or 3:4 or 4:3)

(3) $\frac{2}{3} : 3\frac{1}{3}$ = …… : …… (1:2 or 2:5 or 1:10 or 1:5)

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(4) 5 kg : 3000 gm = … : … (5:2 or 5:3 or 2:5 or 3:5)

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(5) $\frac{1}{2}$ day : 18 hours = … : … (3:2 or 4:3 or 2:3 or 1:9)

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(6) 28 days : 5 weeks = … : … (28:5 or 5:28 or 5:4 or 4:5)

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[3] Story problems:

(1) If Ahmed drinks 21 glasses of milk weekly, then find the rate of what he drinks daily.

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(2) A picture was taken to an artificial scene with a drawing scale 7:1000 If the real length of a tree is 9 metres. Find its length in the picture.

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(3) A rectangular shaped piece of land, the ratio between its length and its width is 9:7, if the difference between the length and the width is 18 metres. Calculate each of the length, the width and the perimeter.

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(4) If the ratio among the prices of three electric sets (TV – oven – refrigerator) is 4:5:8 and if the price of TV is L.E. 1200 Calculate the price of each of the oven and the refrigerator.

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(5) The number of pupils in a school is 400 pupils, if the number of girls is 300 Find the ratio between:

(a) The number of girls : the number of boys.

(b) The number of boys : the number of all pupils

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(6) If the drawing scale which is registered on a map is 1:600000 and if the drawing distance between two cities on this map is 7 cm. Find the real distance between them in kelometres.

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(7) If 100 grams from a food stuff gives 300 calories. How many calories will be given from 30 grams of this food?

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(8) If the ratio between two acute angles in a right-angled triangle is 2:1 Find the measure of each angle.

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(9) If the ratio among the area of three pieces of land is 5:7:6 and the difference between the area of the first piece and the third piece is 55 m^2. Calculate the area of each piece.

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(10) In an exam the difference between the number of succeeded pupils and the failure pupils is 90 pupils and the ratio between them was 5:2 Calculate the number of the succeeded pupils and the number of the failure pupils in this exam.

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SHEET (10)

Proportional division

(1) A father distributed 900 pounds between his two sons in the ratio 4:5 What is the share of each son?

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(2) A piece of building land was distributed between two brothers in the ratio 7:5, if the share of the first exceeds the share of the second by 80 m^2. Find the share of each of them.

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(3) Two persons started a commercial business, the first paid L.E. 5000 and the second paid L.E. 8000, at the end of the year the profit was L.E. 3900. Find the share of each of them from the profit.

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(4) Three persons started a commercial business for flowers. The first paid L.E. 9000, the second paid L.E. 5400 and the third paid L.E. 7200. At the end of the year, the profit was L.E. 1800. Find the share of each one.

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(5) Hani, Khaled and Fady shared a commercial business, Hani paid L.E. 30 000, Khaled paid L.E. 40 000 and Fady paid L.E. 50 000. At the end of the year the loss was 6 000 pounds. Find the share of each of them from the loss:

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(6) Siham, Sherief and Magdy started a business, Siham paid L.E. 5 000, Sherief paid L.E. 3 000 and Magdy paid L.E. 4 000. At the end of the year, the sum of the share of Sherief and Magdy was L.E. 1610. Find the share of each one.

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(7) A man died leaving a capital of L.E. 60 000 to be distributed among his wife, a son and two daughters. If the share of the wife is $\frac{1}{8}$ of the capital and the share of the son is twice that of one daughter. Calculate the share of the wife, the son and each of his daughters.

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SHEET (11)

Percentage

The percentage is a ratio its second term is 100

[1] Complete:

(1) $\frac{1}{2}$ = ……… %

(2) $\frac{4}{25}$ = ……… %

(3) $\frac{9}{20}$ = ……… %

(4) $\frac{3}{4}$ = ……… %

(5) 0.825 = ……… %

(6) 36% + 24% - 17% = ………

(7) 15% + 0.35 + $\frac{1}{2}$ = ……… %

(8) $\frac{3}{7} \times \frac{7}{3}$ = ……… %

(9) $1 - \frac{3}{4}$ = ……… %

(10) 23% of 300 = ………

(11) 45% of 200 = ………

(12) 15% of ……… = 75

(13) 9% of ……… = 72 kg

(14) 25% of ……… = 120

(15) If the percentage of absent students is 8%. Find the percentage of attendance is …………………%.

[2] Find the value of x in each of the following:

(1) $\frac{x}{9} = 15\%$ x = ………………………………………

(2) $\frac{x}{12} = 36\%$ x = ………………………………………

(3) $\frac{x+6}{20} = 50\%$ $x+6$ = ……………………………………… x = ………………

(4) $\frac{x-2}{100} = 25\%$ $x-2$ = ……………………………………… x = ………………

[3] Choose the correct answer:

(1) $\frac{7}{20}$ = ……… % (30 or 35 or 40 or 45)

(2) 50% = ……… ($\frac{1}{4}$ or 0.5 or 5 or 50)

(3) 1 – 25% = …… ($\frac{3}{4}$ or $\frac{1}{4}$ or $\frac{1}{8}$ or $\frac{3}{8}$)

(4) 45% of a kilogram = …… gm (450 or 4500 or 45 or 0.45)

[4] Story problems:

(1) In a mathematics examination, Rahmah scored 23 marks out of 25 marks. Find the percentage of the scored mark of Rahmah.

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(2) There are 750 pupils in a school, 15 pupils were absent one day. Find the percentage of absentness on that day.

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(3) A basket contains 32 oranges and 18 apples. Find the percentage of oranges in the basket.

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(4) The number of pupils in a sixth form in a primary school is 200 pupils, if 180 pupils of them succeeded. Find the percentage of the failure in this school in this form.

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(5) If the percentage of the number of girls in a class which is mixed is 67%. Find the percentage of the number of boys.

……………………………………………………………………………………

(6) A dress has a sign saying that is made cloth with 55% cotton, 15% wool and the remaining is synthetic. Find the percentage of the synthetic

……………………………………………………………………………………

SHEET (12)

Applications on the percentage

Story problems:

(1) A shopkeeper bought a TV set for L.E. 1440 and sold it for L.E. 1800. Find his profit and the percentage of it.

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(2) Medhat bought a car for L.E. 35 500 and sold it for L.E. 31 240. Find the percentage of loss.

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(3) A shopkeeper bought some goods for L.E. 4 800 and sold them for L.E. 5 400. Find his percentage of profit.

……………………………………………………………………………………

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(4) A shopkeeper bought some goods for L.E. 4 500. He spent L.E. 500 to transport them. He sold these goods for L.E. 6 250. Find his percentage of profit.

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(5) Hazem bought a car for L.E. 35 000 and he spent L.E. 15 000 for repairing it, then he sold it for L.E. 55 000. Calculate the percentage of profit.

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(6) The selling price of some goods was L.E. 1 475, if the merchant sold it at a profit of 18%, then find the cost price and the profit.

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(7) Find the buying price of goods sold for L.E. 21 505 and the percentage profit is 15% and find the profit.

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(8) A sheep merchant bought a ram for L.E. 436 and he spent L.E. 64 on feeding it. If he sold the ram at a profit of 12.5%, then find its selling price.

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(9) A man bought a washing machine for L.E. 4 600 and spent L.E. 400 for repair it. He sold it with loss of 16% of the cost price. Find the selling price and his loss in L.E.

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(10) A man bought a boat for L.E. 5 480 and spent L.E. 1 020 to repair it. Find the selling price if his percentage of loss is 6%.

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(11) A man bought a TV set. He was given a 5% discount of its marked price which was L.E. 850. Find its discount price.

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(12) The price of a mobile phone before discount is L.E. 240. If the discount is 20%. What is its price after the discount?

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(13) Mariam deposited L.E. 3 000 in a bank with an interest of 10.5% yearly. Find the total amount that Mariam got at the end of the year.

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(14) A man deposited a sum of money L.E. 40 000 in a bank with annual interest 9.5%. Find the total amount which he gets at the end of one year.

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(15) The production cost of an 8 feet fridge is L.E. 900. A 10% production tax is added to the cost. What is the total cost of the fridge?

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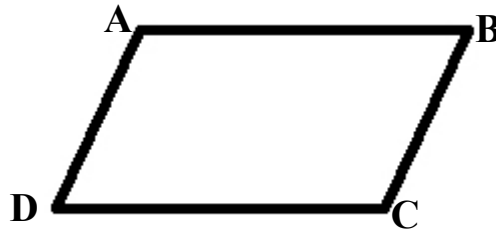
SHEET (13)

The relations between the geometrical shapes

Parallelogram

A parallelogram: is a quadrilateral in which each two opposite sides are parallel.

Properties of parallelogram:

(1) Each two opposite sides are equal in length.

$AB = DC$; $AD = BC$

(2) Each two opposite angles are equal in measure.

$m(\angle A) = m(\angle C)$; $m(\angle B) = m(\angle D)$

(3) The sum of the measure of each two consecutive angles is 180°.

$m(\angle A) + m(\angle B) = 180^\circ$; $m(\angle B) + m(\angle C) = 180^\circ$

$m(\angle C) + m(\angle D) = 180^\circ$; $m(\angle D) + m(\angle A) = 180^\circ$

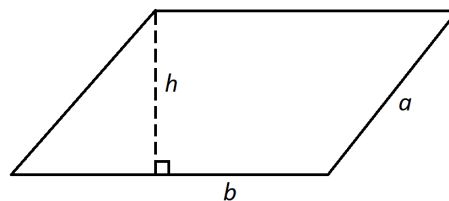
(4) The two diagonals bisect each other.

$AM = CM$; $BM = DM$

(5) Notice that:

Area of ▱ = b × h

P. of ▱ = (a + b) × 2

= the sum of two adjacent sides × 2

Rectangle

The rectangle is a parallelogram with a right angle.

Properties of rectangle:

(1) Each two opposite sides are equal in length.

$AB = DC$; $AD = BC$

(2) The 4 angles are equal in measure and the measure of each is 90°.

$m(\angle A) = m(\angle B) = m(\angle C) = m(\angle D) = 90^0$

(3) The sum of the measure of each two consecutive angles is 180°.

$m(\angle A) + m(\angle B) = 180^o$; $m(\angle B) + m(\angle C) = 180^o$

$m(\angle C) + m(\angle D) = 180^o$; $m(\angle D) + m(\angle A) = 180^o$

(4) The two diagonals bisect each other.

$AN = CN$; $BN = DN$

(5) The two diagonals are equal in length.

$AC = BD$ then $NA = NC = NB = ND$

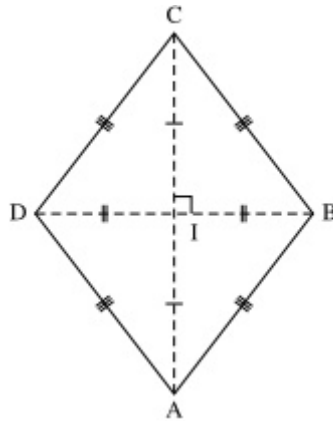
(6) Area of rectangle = L × W ; $L = \frac{A}{W}$; $W = \frac{A}{L}$

P. of rectangle = (L + W) × 2 ; $L = \frac{P}{2} - W$; $W = \frac{P}{2} - L$

A parallelogram is a rectangle if:

(1) One of its angles is right.

(2) Its two diagonals are equal in length.

Rhombus

The rhombus is a parallelogram in which two adjacent sides are equal in length.

Properties of rhombus:

(1) The 4 sides are equal in length.

$AB = BC = CD = DA$

(2) Each two opposite angles are equal in measure.

$m(\angle A) = m(\angle C)$; $m(\angle B) = m(\angle D)$

(3) The sum of the measure of each two consecutive angles is 180°.

$m(\angle A) + m(\angle B) = 180^o$; $m(\angle B) + m(\angle C) = 180^o$

$m(\angle C) + m(\angle D) = 180^o$; $m(\angle D) + m(\angle A) = 180^o$

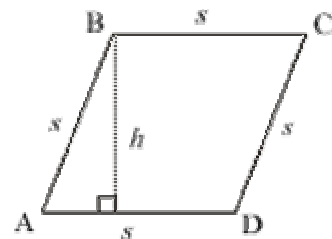
(4) The two diagonals bisect each other.

$NC = NA$; $ND = NB$

(5) The two diagonals are perpendicular.

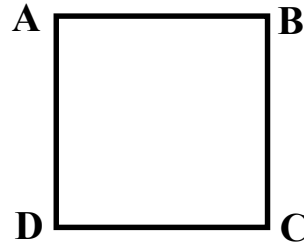
$\overline{AC} \perp \overline{BD}$ then $m(\angle ANB) = m(\angle BNC) = m(\angle CND) = m(\angle DNA) = 90^o$

(6) Area of rhombus = S × h

P. of rhombus = S × 4

A parallelogram is a rhombus if:

(1) Two adjacent sides are equal in length.

(2) Its two diagonals are perpendicular.

Square

- ☞ The square is a parallelogram with a right angle and 2 adjacent sides equal in length.
- ☞ The square is a rectangle with 2 adjacent sides equal in length
- ☞ The square is a rhombus with a right angle.

Properties of square:

(1) The 4 sides are equal in length.
$AB = BC = CD = DA$

(2) The 4 angles are equal in measure and the measure of each is 90°. $m(\angle A) = m(\angle B) = m(\angle C) = m(\angle D) = 90^0$

(3) The sum of the measure of each two consecutive angles is 180°.
$m(\angle A) + m(\angle B) = 180^o$; $m(\angle B) + m(\angle C) = 180^o$
$m(\angle C) + m(\angle D) = 180^o$; $m(\angle D) + m(\angle A) = 180^o$

(4) The two diagonals bisect each other.
$NC = NA$; $NB = ND$

(5) The two diagonals are equal in length.
$AC = BD$ then $NA = NC = NB = ND$

(6) The two diagonals are perpendicular.
$\overline{AC} \perp \overline{BD}$ then $m(\angle ANB) = m(\angle BNC) = m(\angle CND) = m(\angle DNA) = 90^o$

(7) Area of square = S × S
P. of square = S × 4; S = P ÷ 4

A parallelogram is a square if:

(1) One of its angles is right and 2 adjacent sides equal in length.

(2) One of its angles is right and its diagonals are perpendicular.

(3) The 2 diagonals are equal in length and perpendicular.

(4) Two adjacent sides are equal in length and its diagonals are equal in length.

The relations between the geometrical shapes

Parallelogram

two diagonals are perpendicular
two adjacent sides are equal in length

two diagonals are equal in length
has a right angle

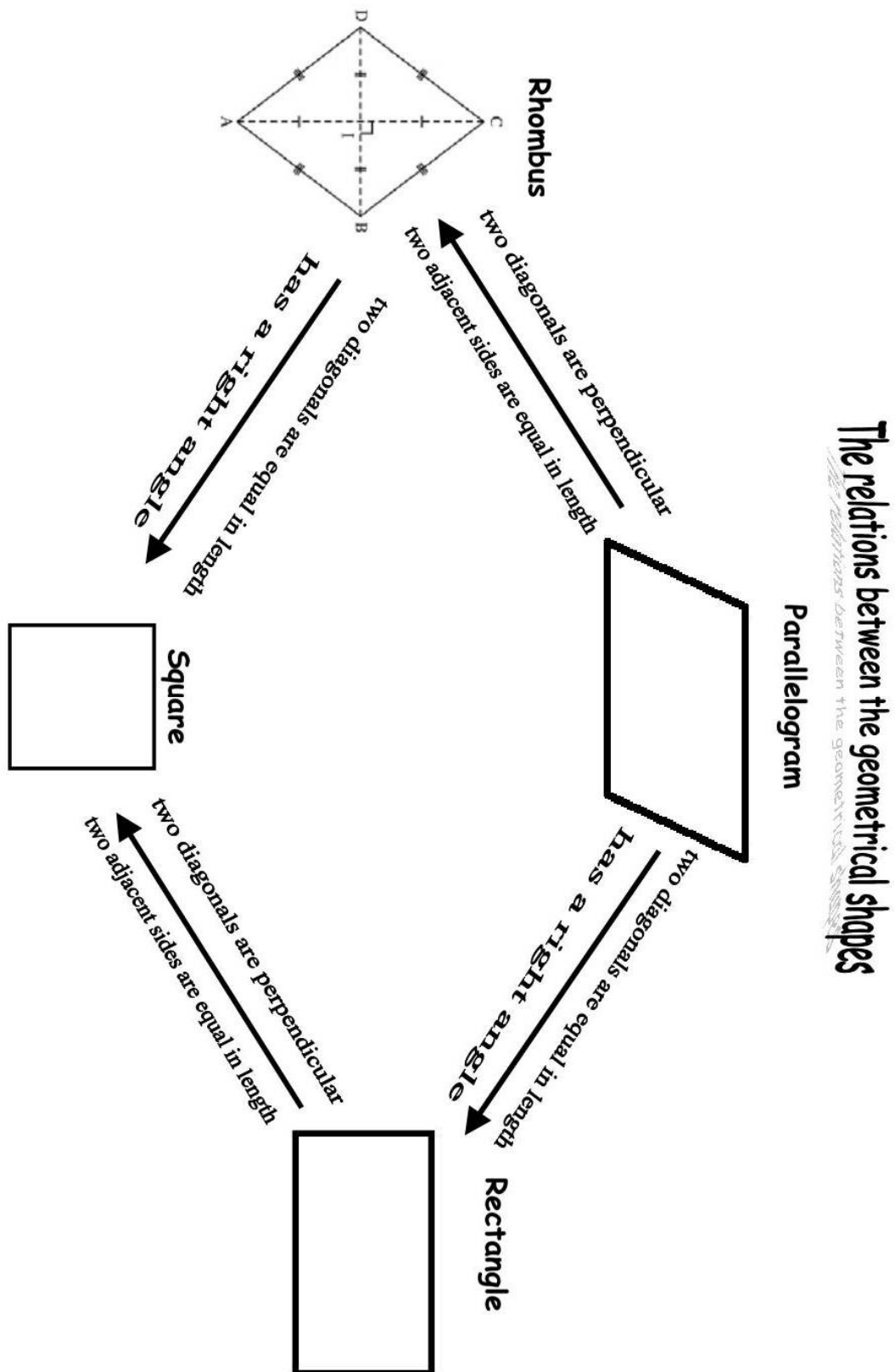
Rhombus

C B A D I

two diagonals are equal in length
has a right angle

Rectangle

two diagonals are perpendicular
two adjacent sides are equal in length

Square

SHEET (14)

Exercises on the relations between the geometrical shapes

[1] Complete:

(1) The parallelogram is a quadrilateral in which its two diagonals ……………………………………………

(2) In the parallelogram, the sum of measures of any consecutive angles = ……………°.

(3) In the parallelogram, each two opposite sides are …………………… and …………….. in length.

(4) A parallelogram is a rhombus when its diagonals are ……………………….

(5) The rectangle is a parallelogram ………………………………………………………

(6) The parallelogram whose one of its angles is right is called ……………

(7) The rhombus whose one of its angles is right is called ……………………

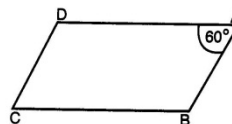
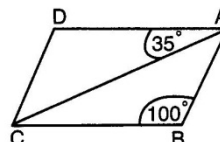
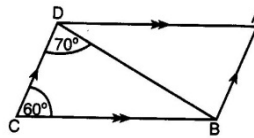
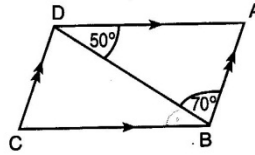
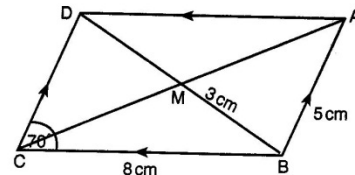
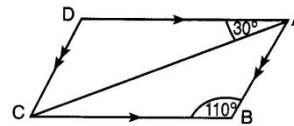
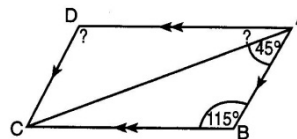
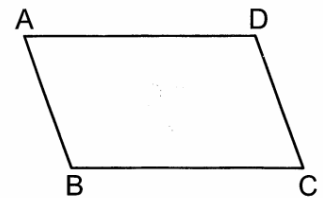
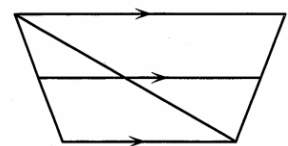
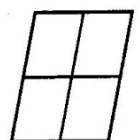
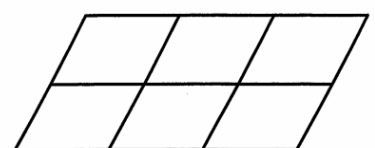
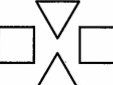
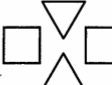
(8) If one of the angles of the parallelogram is right and two of its adjacent sides are equal in length, then it's called ……………………….

(9) The rhombus is a square if …………………………… are equal in length.

(10) The two diagonals of the rectangle are ……………………………………….

(11) The two diagonals are perpendicular and equal in length in ……………..

(12) The two diagonals are equal in length and not perpendicular in ……………………..

(13) From the opposite figure: find $m(\angle B)$ and $m(\angle C)$.

(14) From the opposite figure: find $m(\angle D)$ and $m(\angle ACD)$

(15) From the opposite figure:
find $m(\angle A)$ and $m(\angle ADB)$.

(16) From the opposite figure:
find $m(\angle C)$ and $m(\angle CDB)$

(17) From the opposite figure:
find:
(1) $m(\angle ADC)$
(2) the perimeter of the CBD.

(18) From the opposite figure:
find $m(\angle D)$ and $m(\angle CAB)$

(19) From the opposite figure:
find $m(\angle D)$ and $m(\angle CAD)$

(20) **In the opposite figure :**
ABCD is a parallelogram in which
m (∠ A) + m (∠ C) = 140° , then :
m (∠ B) = ...°

(21) **In the opposite figure :**
The number of trapezoids is .... **(Souhag 2014)**

(22) The number of parallelograms in the opposite figure is ......

(23) **In the opposite figure :**
The number of parallelograms which can be obtained is ....

Discover the pattern in each case of the following and describe it then complete its repetition twice :

a. 🕮 !!?? !!?? ....

b. ....

c. 🕮 .... (Port Said 2013)

d. ....

e. 🕮 ....

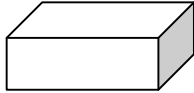
f. ....

g. ....

h. ....

SHEET (15)

Cuboid

The solid is any object that occupies a room in the space

Cuboid

Each face as a rectangle
4 lateral faces + 2 bases
6 faces
8 vertices
12 edges

Cube

Each face as a square
4 lateral faces + 2 bases
6 faces
8 vertices
12 edges

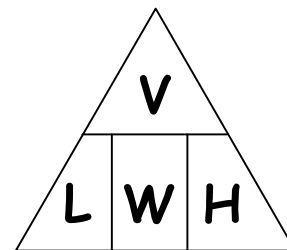
1st Cuboid

[1] If the example states dimensions (length, width and height):

$V = L \times W \times H$

$$L = \frac{V}{W \times H}$$

$$W = \frac{V}{L \times H}$$

$$H = \frac{V}{L \times W}$$

Ex (1): The dimensions of a cuboid are 4 cm, 3 cm and 8 cm. Find its volume.

……………………………………………………………………………………………………

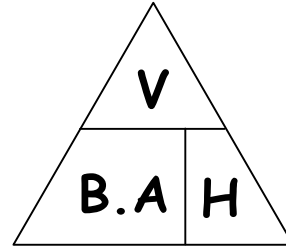
Ex (2): A cuboid its dimensions 8 cm, 6 cm and 10 cm, then its volume is …………… cm^3.

Ex (3): A cuboid whose volume is 400 cm^3, its length 8 cm, its width 5 cm, then its height is ……………… cm.

[2] If the example states base area:

V = base area × height

$$B.A = \frac{V}{H}$$

$$H = \frac{V}{B.A}$$

Ex (4): The volume of a cuboid with base area 160 cm^2 and its height 10 cm is ………… cm^3.

Ex (5): If the volume of a cuboid is 27 cm^3 and its height 3 cm then the base area is ………… cm^2.

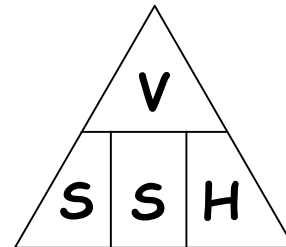
Ex (6): The area of a rectangular base of a cuboid whose volume is 245 cm^3 and its height is 35 cm is …………… cm^2.

Ex (7): If the volume of cuboid 64 cm^3 and the area of its base is 16 cm^2 then its height is …………… cm.

[3] If the example states a square base:

V = S × S × H

$$S \times S = \frac{V}{H}$$

$$H = \frac{V}{S \times S}$$

Ex (8): A cuboid with a square base of side length 6 cm and its height 10 cm then its volume is …………… cm^3.

Ex (9) A cuboid has a square base of side length 8 cm what is the height of the box if its volume is 384 cm^3.

…………………………………………………………………………………………………

Ex (10): The volume of the cuboid is 54 cm^3 with its base is square shaped of side length 3 cm then its height ……………………… cm.

Ex (11): The base of a cuboid is a square its volume is 45 cm^3 and its height 5 cm then the side length of its base its base is …………… cm

Ex (12): Which is greater in volume? A cuboid of dimensions 7 cm, 6 cm and 8 cm or a cuboid of base area 30 cm^2 and its height 12 cm.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

Complete:

a. The volume of the cuboid = ……… × ……… × ………

b. The volume of the cuboid = ……… × ………

c. The height of a cuboid = $\frac{\cdots\cdots}{\cdots\cdots}$

d. A cuboid is with dimensions 8 cm. , 6 cm. and 10 cm. , then its volume is ……… cm^3

e. The volume of a cuboid with base area 160 cm^2 and height 10 cm. is ………

f. If the volume of a cuboid is 27 cm^3 and its height is 3 cm. , then the area of its base ……… cm^2

g. The area of a rectangular base of a cuboid whose volume is 245 cm^3 and its height is 35 cm. is ………

h. If the volume of a cuboid is 64 cm^3 and the area of its base is 16 cm^2 , then its height = ……… cm.

i. A cuboid whose volume is 400 cm^3 , its length is 8 cm. its width is 5 cm. , then its height equals ……… cm.

Choose the correct answer:

a. The volume of a cuboid of dimensions 5 cm. , 2 cm. and 3.2 cm. = ... cm^3 (32 *or* 320 *or* 10.2 *or* 16)

b. The volume of a cuboid whose dimensions are 4 cm. , 2 cm. and 6 cm. = ... cm^3

(36 *or* 24 *or* 84 *or* 48)

c. A cuboid with a square base of side length 6 cm. and height 10 cm. , then its volume is .... (36 cm^3 *or* 60 cm^2 *or* 60 cm^3 *or* 360 cm^3)

d. If the volume of a cuboid = 60 cm^3 and its base area = 10 cm^2 , then its height = ... cm. (4 *or* 14 *or* 6 *or* 8)

e. The height of a cuboid whose volume is 48 cm^3 and the area of its base is 24 cm^2 = ...

(2 cm. *or* 2 cm^2 *or* 2 cm^3 *or* 2 m.)

f. The volume of a cuboid = 300 cm^3 , its base is with length = 6 cm. and its width = 5 cm. , then its height = ... cm.

(8 *or* 12 *or* 10 *or* 30)

g. The volume of a cuboid equals 400 cm^3 and its base is with length = 8 cm. and width = 5 cm. , then its height equals .... cm.

(50 *or* 10 *or* 80 *or* 20)

h. A cuboid is with volume 2 700 cm^3 and its square base is of side length 3 cm. , then its height is ....

(30 cm. *or* 3 cm^2 *or* 30 cm^3 *or* 300 cm.)

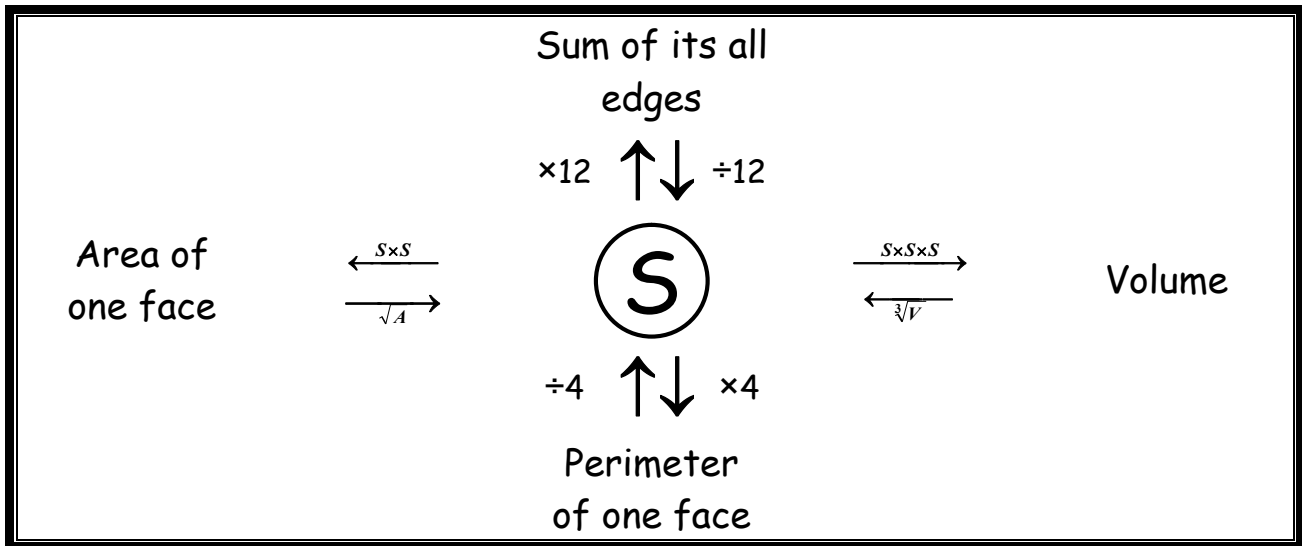
i. The volume of the cuboid is 54 cm^3 with its base is square shaped of side length 3 cm. , then its height = ... cm.

(42 *or* 8.5 *or* 6 *or* 4.5)

SHEET (16)

Cube

A Cube: is a cuboid with equal dimensions.

Each dimension is called edge length (S).

[A] Story problems:

(1) What is the volume of a cube of edge length 4 cm?

....

(2) Find the volume of a cube with edge length 7 cm.

....

(3) Find the volume of a cube with edge length 3 cm.

....

(4) Find the volume of a cube with edge length 1 cm.

....

(5) Find the volume of a cube if the perimeter of one of its faces is 28 cm.

....

....

(6) Find the volume of the cube if the perimeter of its base is 20 cm.

....

....

(7) The sum of lengths of all edges of a cube is 108 cm. Calculate its volume.

....

....

(8) If the sum of lengths of all edges of a cube is 132 cm. Calculate its volume.

....

....

(9) Which is greater in volume? A cube of edge length 10 cm or a cuboid of dimensions 11 cm, 7 cm and 10 cm. Then find the difference between their volumes.

....

....

....

....

(10) A metallic cube of edge length 12 cm was melted and converted to a number of equal small cuboids of dimensions 8 cm, 2 cm and 9 cm each. Find out the number of the cuboids.

....

(11) A piece of metal is in the shape of a cube of edge length 9 cm was melted to be a cuboid of length 12 cm and width 9 cm. Find the height of the cuboid.

....

(12) A metallic piece in the shape of a cuboid its dimensions are 4 cm, 6 cm and 9 cm. It is melted and converted to a cube. Find the edge length of the cube.

....

....

(13) A cube of cheese is of edge length 15 cm it is wanted to be divided into small cubes the edge length of each is 3 cm for presenting them through meals. Calculate the number of the resulting small cubes.

....

(14) A box made of cartoon in the shape of cuboid its internal dimensions are 50 cm, 40 cm and 30 cm. Its needed to fill it with cube-shaped bars of soap with edge length 10 cm. Find the number of bars.

....

(15) If the sum of areas of faces of a cube 150 cm^2. Find its volume.

....

....

....

[B] Complete:

(1) The cube is a cuboid with .... dimensions.

(2) If the dimensions of a cuboid are equal, then it is called a ....

(3) The volume of a cube = ... × .... × ....

(4) If the perimeter of one face of a cube is 8 cm, then its volume is .... cm^3.

(5) If the area of one face of a cube is 25 cm^2, then its volume is .... cm^3.

(6) If the area of the base of a cube is 64 cm^2, then its volume is ………… cm^3.

(7) A cube whose volume 125 cm^3, then its edge length is ……… cm.

(8) A cube whose volume 8 cm^3, then its edge length is ……… cm.

(9) A cube whose volume 27 cm^3, then its edge length is ……… cm.

(10) A cube whose volume 64 cm^3, then its base area is ……… cm^2.

(11) A cube of edge length 9 cm, then the sum of all its edge lengths = ………… cm

(12) A cube, the area of its base is 16 cm^2, then its volume is ……… cm^3.

(13) A cube, its volume is 125 cm^3, then the area of its face = ……… cm^2.

[C] Choose the correct answer:

(1) If area of one face of a cube is 1 cm^2, then its volume is …………

[6 cm^3 , 4 cm^3 , 1 dm^3 , 1 cm^3]

(2) A cube whose volume 1 cm^3, then the sum of all its edge lengths ……

[24 cm , 12 cm , 6 cm , 1 cm]

(3) The ratio between two edge lengths of the cube is ……………

[1 : 4 , 1 : 1 , 4 : 1 , 1 : 12]

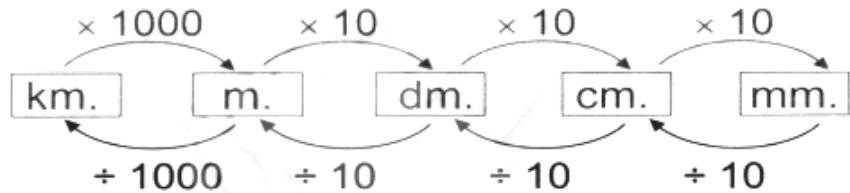
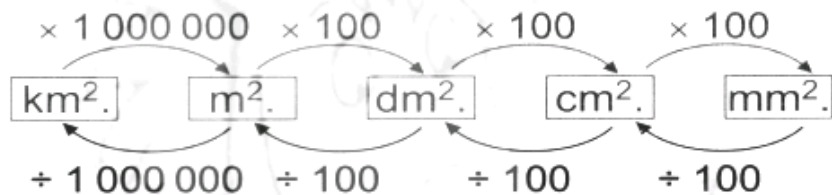
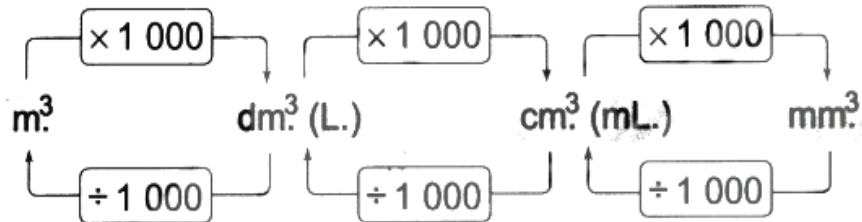
(4) The cubic centimetre is a unit for measuring the ……………

[perimeter , area , volume , length]

SHEET (17)

Capacity

Capacity is the inner volume of a hollow solid

Litre is the unit for measuring capacity

The area units

The capacity units

[1] Complete:

(1) ………………… is the measuring unit of capacity.

(2) 4.6 litres = ………………… millilitres.

(3) 0.0781 L = …………………… cm^3.

(4) 2.7 dm^3 = …………………… litres.

(5) 3 dm^3 = ……………………… cm^3.

(6) 7 m^3 = ………………… litres.

(7) 7300 ml = ……………………… dm^3.

(8) 2.22 litres = ……………………… ml.

(9) 5.6 dm^3 = ……………………… ml.

(10) 370 cm^3 = ……………………… litres.

(11) A case in the shape of a cube, its external volume is 1000 cm^3 and its capacity is 729 cm^3, then the volume of the material that the case is made of is ………………… cm^3.

[2] Choose the correct answer:

(1) The litre is a unit for measuring …………
[length , distance , capacity , time]

(2) 1 litre = …………… ml.
[10 , 100 , 1000 , 10 000]

(3) 51 cm^3 = ………… litre.
[0.051 , 0.51 , 510 , 51]

(4) 5.3 litres = ………………… dm^3.
[5300 , 0.0053 , 53 , 5.3]

(5) 0.001 dm^3 = ……………… cm^3.
[1000 , 1 , 0.1 , 0.01]

(6) 38 ml = ………………… cm^3.
[38000 , 3800 , 380 , 38]

(7) $\frac{3}{4}$ litre = ………………
[75 m , 750 cm^3 , 75 dm^3 , 0.075 m^3]

(8) 2.5 litres = …………………
[0.25 m^3 , 2.5 cm^3 , 25 dm^3 , 2500 cm^3]

[3] Story Problems:

(1) A pot in the shape of a cube if the length of its interior edge equals 20 cm, filled with black honey. Calculate the capacity of the pot of honey in litres.

……………………………………………………………………………………………………

(2) A cuboid-shaped tin of juice is with square base of inner side length 30 cm, if the height of the juice in the tin is 50 cm. Find the volume of juice in litres.

....

(3) A swimming pool is in the shape of a cuboid whose internal dimensions are 40 m, 30 m and 1.8 m. Find its capacity in litres.

....

(4) A cube-shaped vessel, its internal edge length is 30 cm, it's filled with cooking oil.

(a) Calculate the capacity of the vessel in litres.

(b) If the price of one litre of oil is 9.5 pounds, calculate the price of all the oil.

....

....

(5) Two vessels: one of them is a cube with inner edge length 0.4 m and the other is a cuboid with inner dimensions 50 cm, 60 cm and 30 cm. Find the difference between the two capacities of the two vessels in millilitres.

....

....

....

(6) If 500 cm^3 of a certain medicine are packed in small bottles and the capacity of each bottle is 25 ml. Find the number of needed bottles.

....

(7) The internal dimensions of a cuboid-shaped vessel 75 cm, 40 cm and 150 cm. This vessel is filled with oil, the oil is put in bottles, if each bottle hold 1.5 litre. Find the number of needed bottles.

....

(8) The capacity of a bottle is $\frac{3}{4}$ litre, it is filled with alcohol, it is wanted to put this amount in small bottles which the capacity of each of them is 25 cm^3. Find the number of bottles.

....

(9) A container has 12 litres of honey. It is wanted to put them in smaller bottles; the capacity of each of them is 400 cm^3. Calculate the number of bottles which are needed for that.

....

(10) A box for preserving food stuff in the shape of a cube whose the external edge length is 52 cm is made of a material of thickness 1 cm. Find the capacity of the box.

....

SHEET (18)

Statistics

The kinds of data

(1) **Descriptive**: Name - Stage - Grade - Address - E-mail - Favourite colour – Gender Nationality – Blood species

(2) **Quantitative**: Age – Date of birth - Telephone number

Range: is the difference between the greatest value and the smallest value

Range = the greatest value – the smallest value.

The greatest value = range + the smallest value.

The smallest value = the greatest value – range.

The number of sets = the range ÷ the length of set.

The range = the number of sets × the length of set.

The length of set = range ÷ the number of sets.

[1] Complete:

(1) The range of the values 5, 9, 13, 8 and 20 is ……………………

(2) If the values of a frequency distribution lie between 30 and 70, then the range of this distribution = ………………

(3) The range of the set of values 8, 4, 10, 6, and 7 is ………………

(4) If 78 is the greatest individual of a set and the range is 39, then the smallest individual of this set is ………………

(5) If the marks of 6 pupils in one of the test are 29, 33, 57, 40, 36 and 49, then the range for these marks = ……………………

(6) In frequency distribution, the range was 34 and the minimum value is 25, then the maximum value is ....

(7) If 95 is a maximum value in a set and the range equal to 47, then the minimum value in this set is ....

(8) The difference between the greatest value and the smallest value in a set of individuals is called ....

(9) Number of sets = ... ÷ ....

(10) The kind of statistics data are .... and ....

(11) The birth place is a .... data.

(12) The age is a .... data.

(13) The blood type is a .... data.

(14) The length is a .... data.

(15) The weight is a .... data.

(16) The volume is a .... data.

(17) The address is a .... data.

(18) The favourite sport is a .... data.

(19) The qualification is a .... data.

(20) The salary is a .... data.

(21) The job is a .... data.

[2] Choose the correct answer:

(1) The following data are quantitative except ....
(age , number of sons , weight , blood species)

(2) The following data are quantitative except the ....
(age , colour , length , weight)

(3) The opposite data are quantitative except the ....
(temperature degree , tallness , address , weight)

(4) The opposite data are descriptive except ....
(the favourite colour , birthday , age , blood species)

(5) The opposite data are descriptive except ....
(the place of birth , social case , gender , length)

(6) If the values of frequency distribution lie between (20 , 60), then the range of this distribution = ...
(20 , 40 , 60 , 80)

SHEET (19)

Representing data by the frequency curve

$$\text{Centre of the set} = \frac{\text{lower limit} + \text{upper limit}}{2}$$

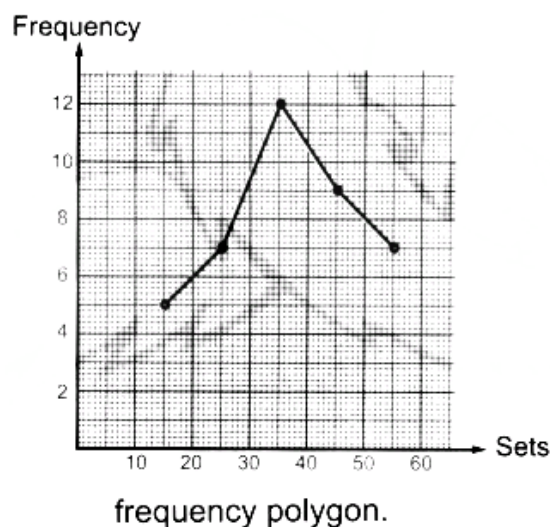
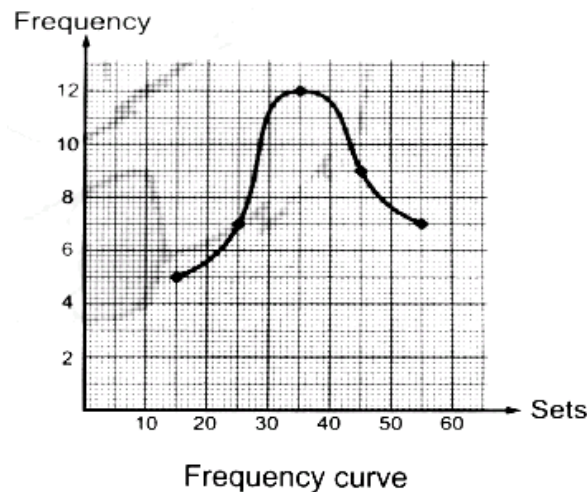
Example:

The following table shows the frequency distribution of marks of 40 pupils in the mathematics exam:

Sets	10-	20-	30-	40-	50-	Total
Frequency	5	7	12	9	7	40

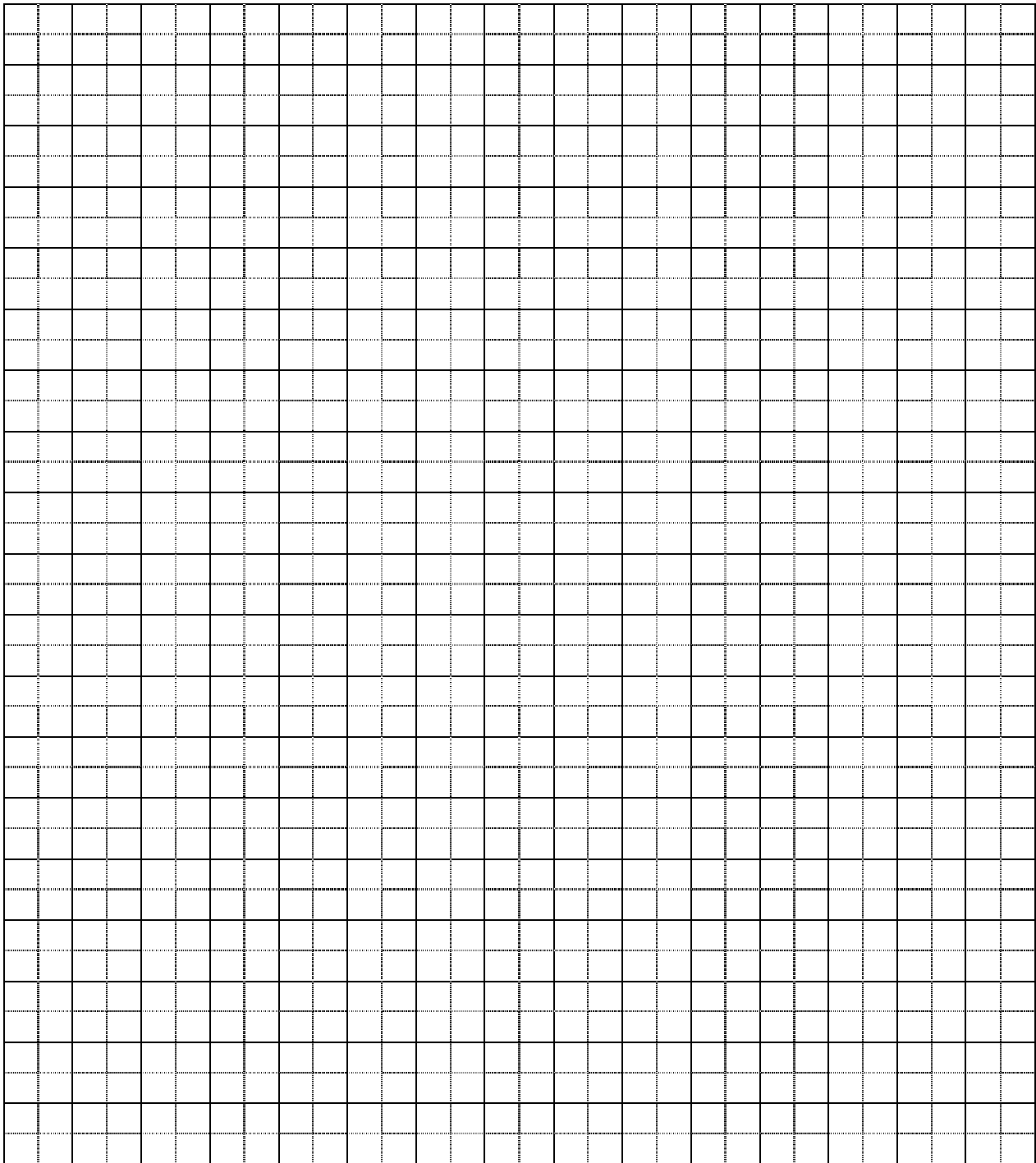
Represent these data by the frequency curve and the frequency polygon.

Frequency curve

frequency polygon.

(1) The following table shows the number of hours which are spent by 60 pupils to study their lessons daily:

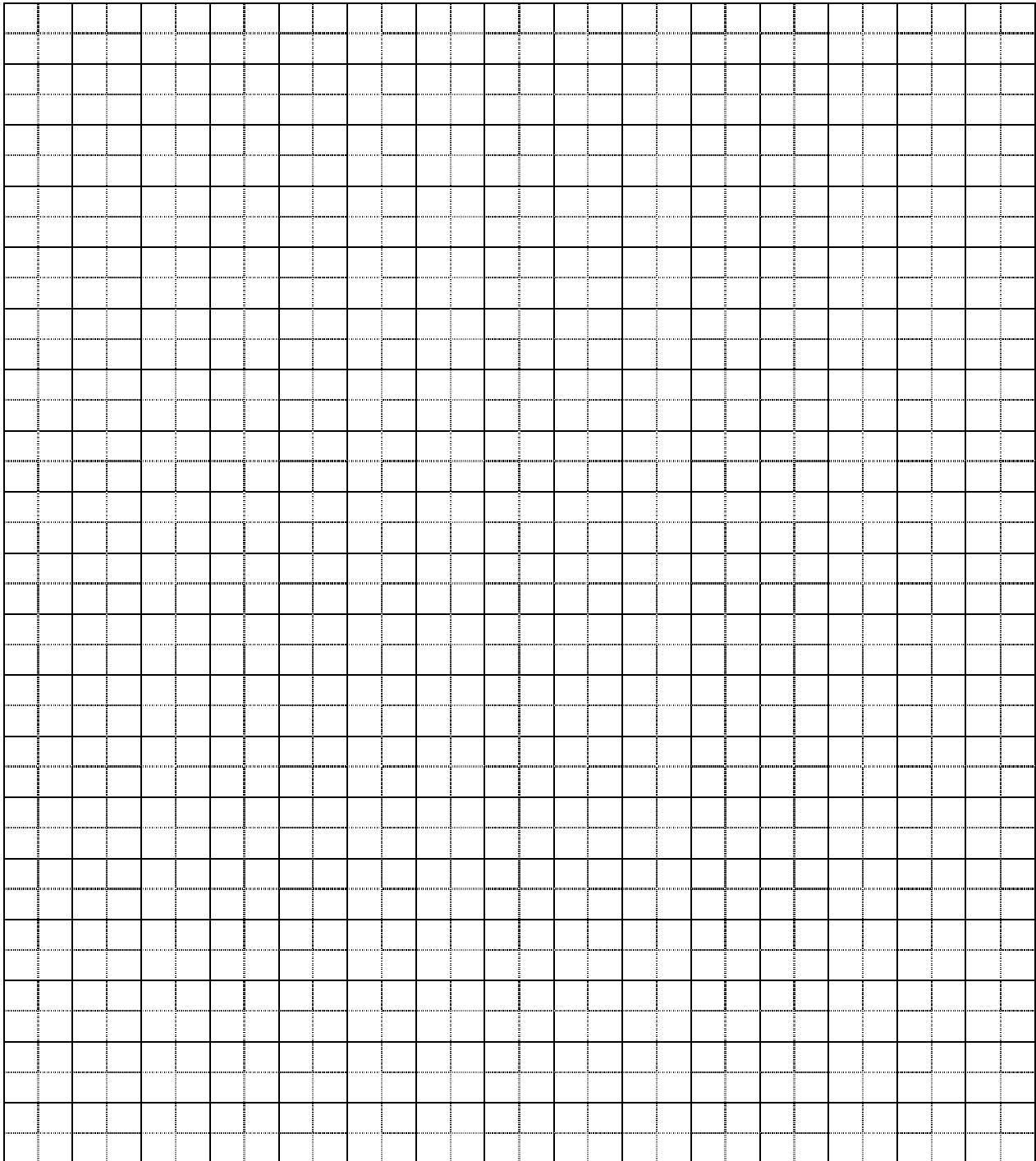
Number of hours	1-	2-	3-	4-	5-6	Total
Number of pupils	9	13	18	12	8	60

(a) Represent these data using the frequency curve.

(b) Find the percentage of the greatest number of pupils in studying their lessons.

(2) The following frequency distribution table shows the daily wages of a sample formed from 50 workers in a factory:

Wages	10-	20-	30-	40-	50-	60-	70-	Total
Number of workers	3	6	10	15	8	5	3	50

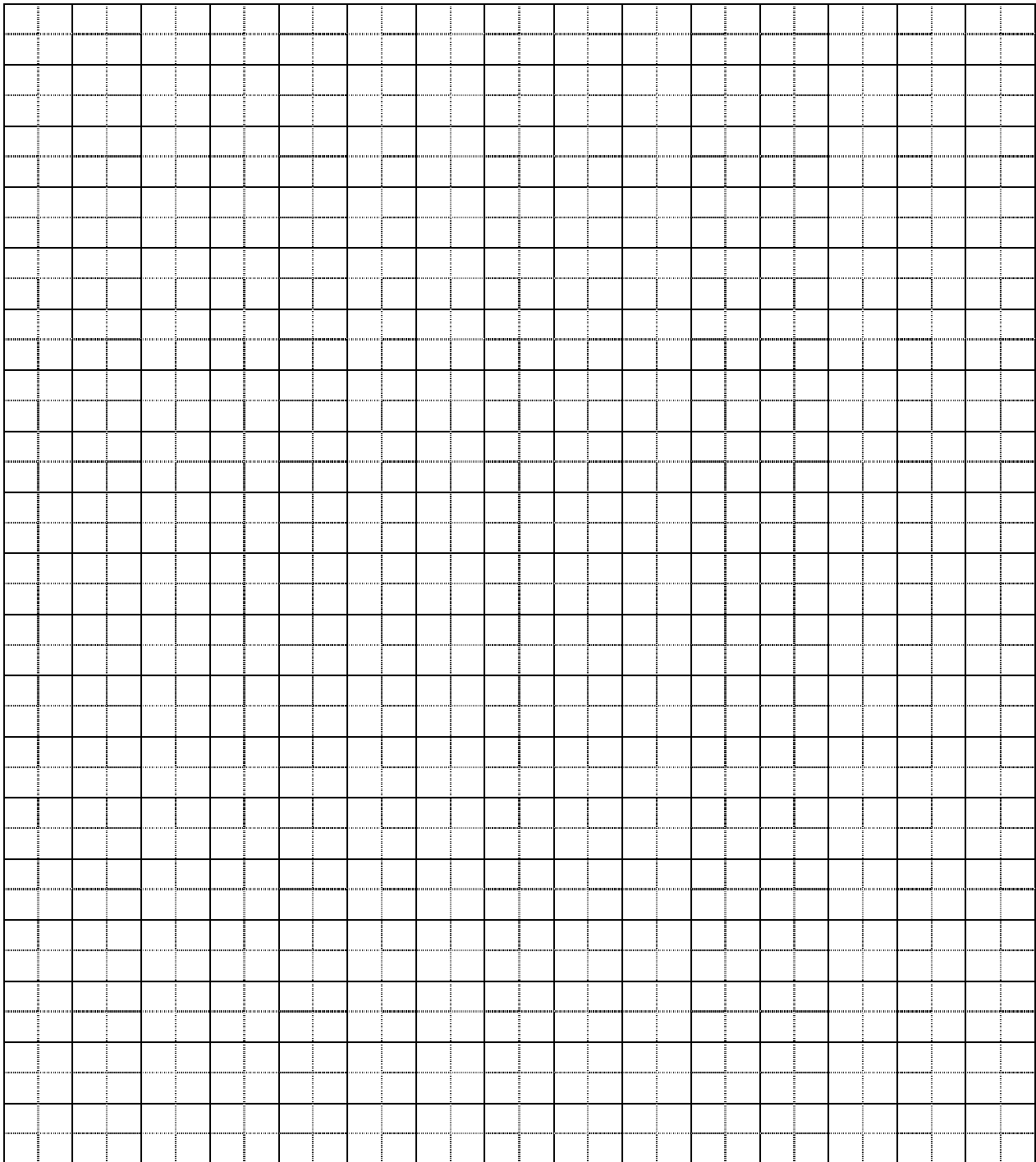
(a) Represent these data using the frequency curve.

(b) Find the percentage of the number of workers whose wage begins from L.E 30 to less than L.E 50.

(3) ***The following table shows the frequency distribution of the ages of 40 students in one school :***

The ages	6 –	8 –	10 –	12 –	14 –	Total
Number of students	8	9	5	13	5	**40**

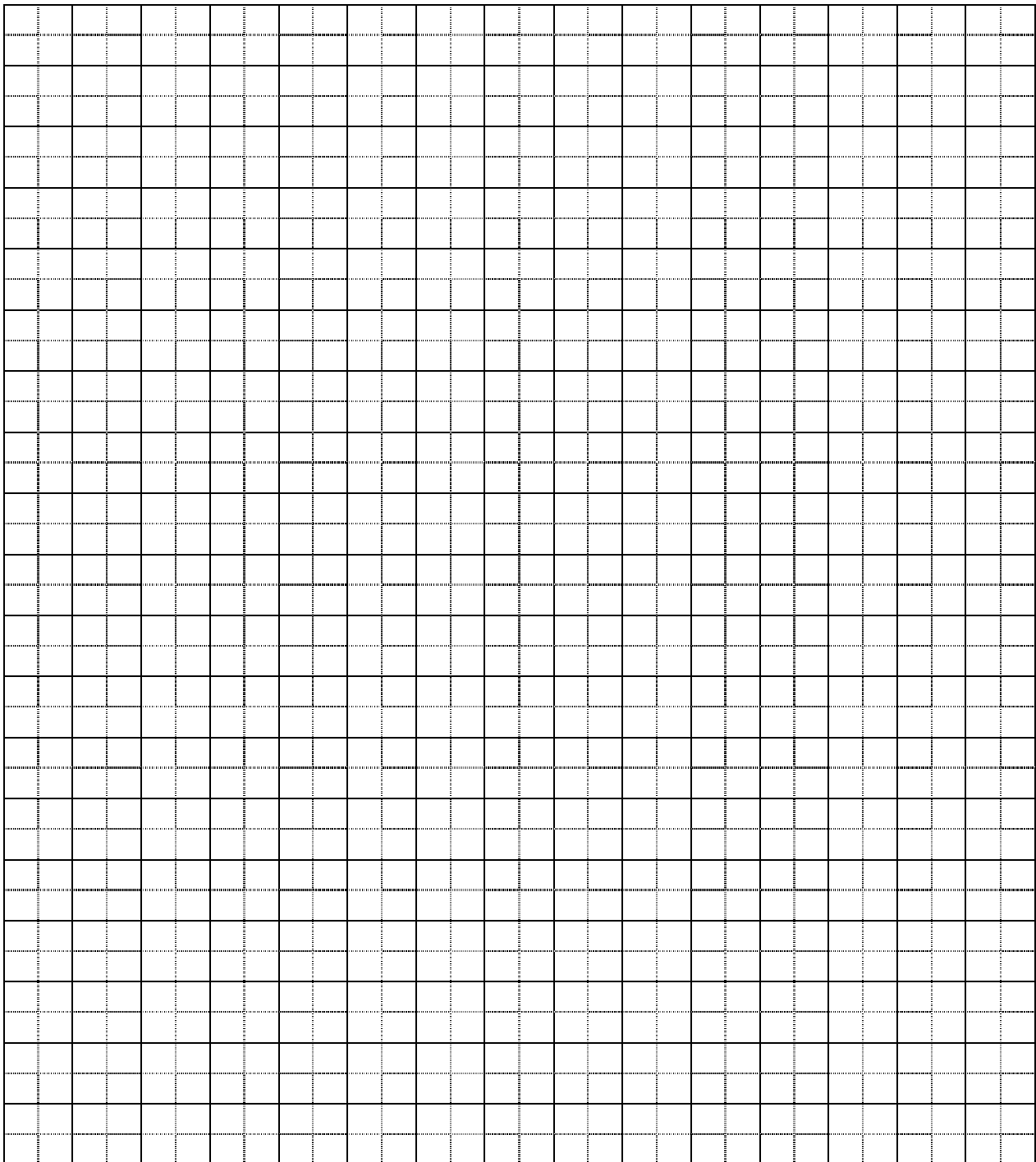
Draw the frequency curve of the previous table , then answer the following questions :

a. How many students whose ages are 12 years or more ?

b. How many students whose ages are less than 10 years ?

(4) The following table shows the degrees of 100 pupils in one month in mathematics exam:

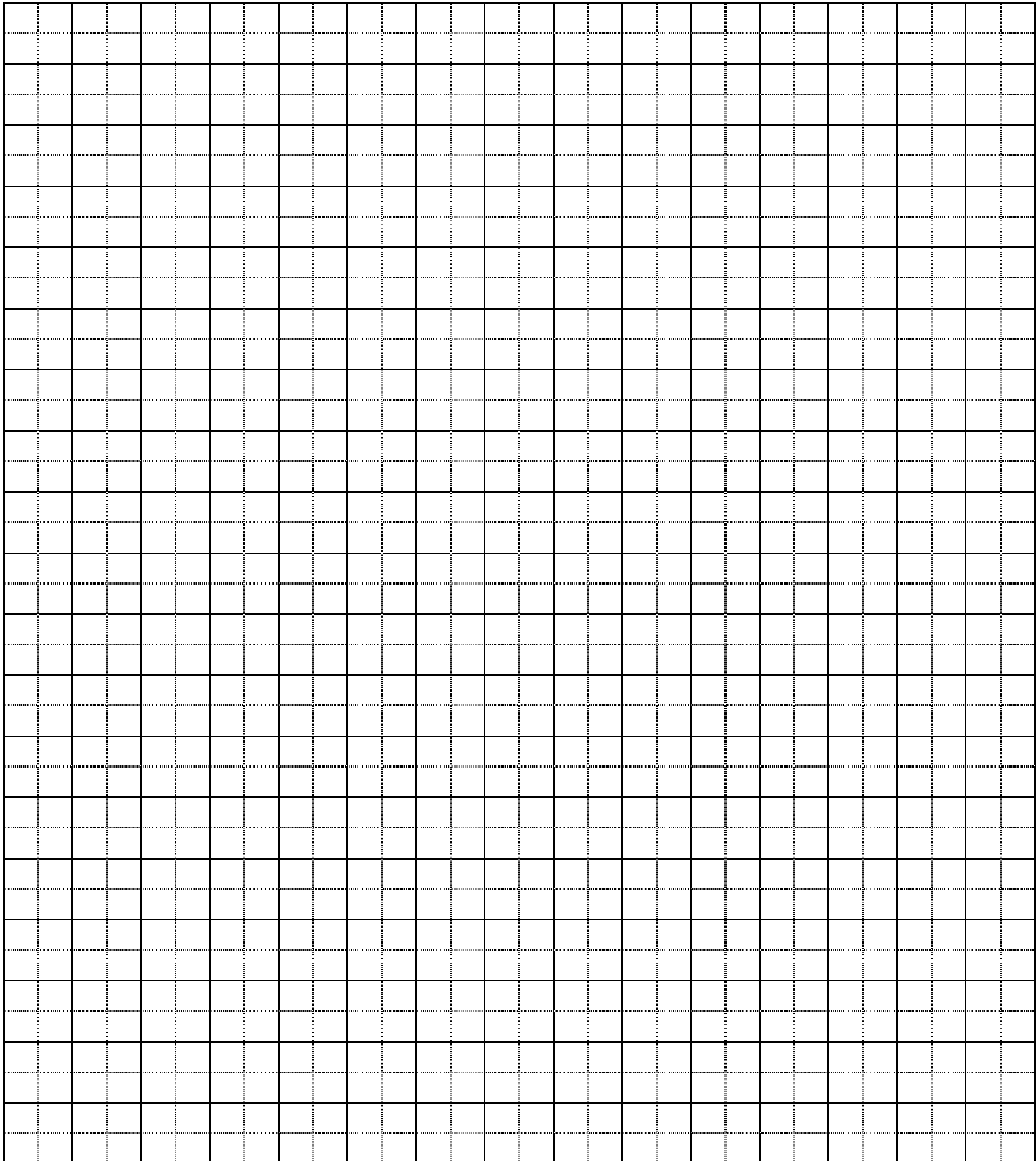
Marks	20-	30-	40-	50	Total
Number of pupils	15	30	40	15	100

(a) What is the number of pupils who record less than 40 degrees?

(b) Draw the frequency curve for this distribution.

(5) On the orphan day a group of 50 students donated amounts of money in pounds shown in the following table:

Money in pounds	3-	5-	7-	9-	11-	Total
Number of students	7	10	15	10	8	50

(a) What is the number of students who donated 7 pounds and more?

(b) Draw the frequency curve for this frequency distribution.

(6) The following table shows the age of visitors to an exhibition within an hour of the day:

Visitor's age	10-	20-	30-	40-	50-	Total
Number of visitors	6	9	12	10	8	45

(a) What is the number of visitors whose ages are less than 40 years?

(b) Draw the frequency curve for this distribution.